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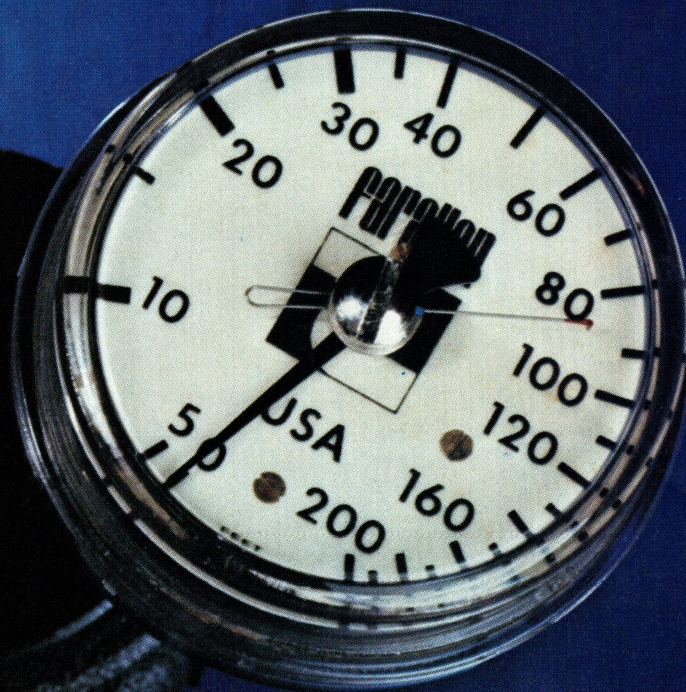
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Volume Twenty-Eight Number Nine



56/On the Brink



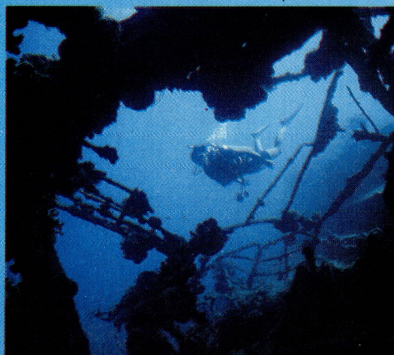
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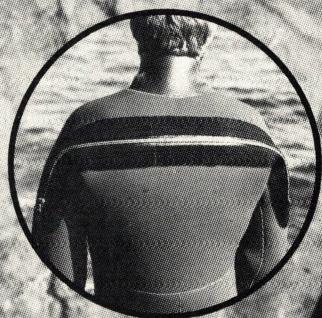
COVER

Michele Binder kneels beside a 12 foot tall gorgonian coral in Australia's fabulous Coral Sea. For more on some of the world's most exciting diving, see Page 88. Photo by Howard Hall.

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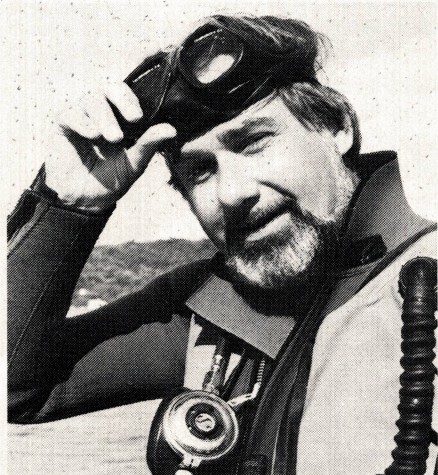


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SDM Editorial

BY THE PUBLISHER



A DIVER'S GREATEST FEAR

Accident research experts would be the first to point out that divers frequently do some very dumb things. Even though these men and women have been properly trained and have a wealth of experience, they make some obvious blunders in judgement. Even though they should know better, veteran divers make mistakes which even a basic scuba student would easily avoid.

An example is the case of the old-time diver who got bent on a dive boat trip off Catalina Island. He knew he had exceeded his maximum bottom time, but bagging that last abalone was important. By the time he had finishing stowing his dive gear, he knew something was wrong. His coordination was off, his mind was a little fuzzy, and he was feeling sharp pains in his right arm. Rather than report this suspected bends hit to the skipper, the diver quietly retreated below decks and crawled into an empty bunk. The pains grew worse and he buried his head in the pillow to keep from groaning out loud. By the time the boat reached San Pedro Harbor, the diver was in total agony. But he still refused to reveal his problem. He simply gritted his teeth and staggered down the ramp with his gear bag and tank. Fortunately he made it to a nearby telephone booth and was able to call his wife for help. Because of the delay

in treatment, this diver suffers from residual effects and still carries a painful reminder of his bout with the bends.

Then there is the case of the East Coast diver who drowned with a load of lobsters. He was one of the best lobster divers around and had a reputation for filling his bags in short order. He was working a wreck in 120 feet and had three bags of lobsters tied to his wrist. This was not unusual, except that there was also a strong current running. Because of his fierce pride, the diver refused to drop his weightbelt. Only amateurs did something like that. Perhaps he should have inflated his BC — but, he wasn't wearing one. Not wearing a BC was another status symbol of the old pros along the coast. Struggling against the current and the drag of his lobster catch, this diver finally ran out of air and his lobstering career ended.

How about the case of the scuba instructor preparing for a wall dive on a Caribbean reef? He and his dive group had just arrived the day before and were eager to sample the deep clear waters of this sensational drop-off. It wasn't until everyone was completely suited up that he noticed his submersible pressure gauge was broken. There was a slight leak at the swivel fitting and the indicator needle had come off the dial face. Normally, he would have changed gauges, but everyone was ready to go and he was holding up the dive. The instructor decided to proceed with the dive in spite of the broken gauge. Surely there would be no problem since he was the instructor and could no doubt outlast the air supply of his newly graduated students.

The dive group descended to 120 feet and started cruising along the wall. It was indeed awesome; visibility seemed to extend to 200 feet. Unnoticed by the instructor, the air leak on the submersible gauge had increased considerably. Although some of the other members of the group noticed the escaping air, they were not alarmed; they thought the instructor knew what he was doing. Then it happened. As they started to ascend, the instructor's tank was completely drained and his regulator stopped working. At first he tried to buddy breathe with a nearby student, but a series of fumbles forced him to make a frantic free ascent from 110 feet.

In all of these case histories, the pattern is the same. An otherwise intelligent, experienced scuba diver makes a serious error in judgement which eventually leads to a dive accident. Sometimes it is fatal. Why do divers do dumb things? Because of deep seated fears which exist in all of us.

As basic divers go through training, they develop self-confidence. They learn new skills, eventually master them, and finally feel secure in knowing they can handle the task without a problem. After graduation, the diver gains more experience and self-confidence turns to pride. The diver develops a reputation for being a competent diver. It is at this point that the diver becomes vulnerable to a new kind of fear. Because of his pride, he now feels more fearful of ridicule from his diving associates than from the actual dangers involved.

It is this fear of ridicule — fear of disappointing others or not living up to one's personal reputation — that eventually leads to problems. Rather than face embarrassment, the diver often prefers to risk his life in a dangerous situation. Rather than delay a dive and inconvenience the rest of the group, a diver will take unnecessary chances with defective or ill-fitting equipment. Rather than admit he may have the bends, a diver will secretly endure the pain and risk the possibility of becoming a permanent cripple. Rather than dump a \$30 weightbelt, a diver will risk remaining on the bottom forever.

What these divers fail to realize is the fact that the consequences of such risk taking are equally embarrassing but usually more permanent. When a good diver drowns from some stupid mistake, the entire diving community is embarrassed. There should be no shame in aborting a dive for either mechanical or health reasons. This is what a good diver is expected to do. There should be no shame in dumping a weightbelt, inflating a BC or asking for help. It is what we have been trained to do in cases of difficulty. A diver should never feel too proud to ask for help when he or she needs it.

The one thing we must always remember is that the greatest danger to a diver is himself. ➤

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Underwater Forum

Hawaii Library Project

The Ka Imi Kai Diving Club has been working with the Hawaii State Library System to establish a substantial book collection on scuba diving and related subjects at one or more of the state libraries. The intended readership is the general diving public, including students, diving instructors, educators, and others interested in diving.

We are seeking book lists and specific title suggestions. We are also looking for knowledgeable people to assist us in making recommendations for the initial purchases. We invite all interested divers to submit suggestions.

By September, we hope to have a listing of desired books for the collection and a priority list of essential reference materials. We then plan to approach individuals, dive clubs, businesses and other organizations with an interest in diving and the ocean to contribute books and/or funds toward the initial acquisitions. Thereafter, the state will maintain and expand the collection using state funds.

For further information, contact:

WALT SIMMONS
President, Ka Imi Kai
44136-2 Hako St.
Kaneohe, HI 96744

Red Sea Delight

We have just returned from a marvelous trip to the Red Sea and would like to say that it is every bit as wonderful as Jack McKenney described [SDM Feb. '79, God's Other World — the Red Sea].

We were completely impressed with the prolific undersea life and the courteous help received from the staff at the Red Sea Diving Center.

As far as we're concerned, the Red Sea is the greatest, and we've already planned another trip for next year.

KARL AND JILL WALLIN
Wallin Divestore
San Carlos, CA

Conserving Shipwrecks

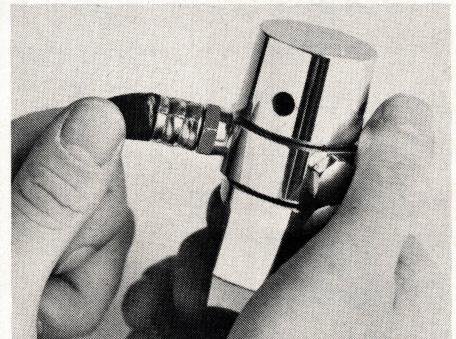
As a marine archaeologist and scuba instructor (NASDS and SSI), I wish to object strongly to Mr. Barada's biased articles on shipwreck legislation in the May '78 and April '79 issues of SKIN DIVER.

First, the conservation of important underwater historic shipwrecks is similar to the establishment of national parks and marine sanctuaries. It has taken 20 years for the diving community to realize the importance of not destroying coral reefs and depleting their marine life, but some-

(Continued on Page 10)

TIPS

To Insure Perfect Scuba



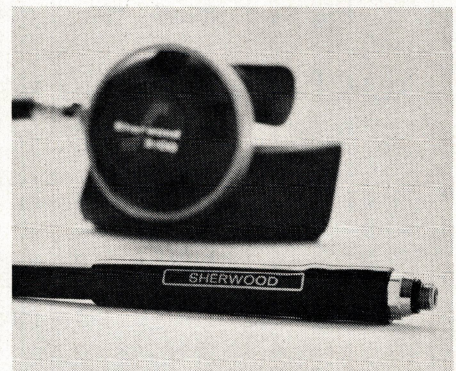
CHECK HOSE FITTINGS BEFORE EVERY DIVE.

Wear and tear on hoses, especially at the point where the hose meets the metal fitting, can end a great day of diving fast.

There are a number of elements working against your hoses, even when you're not in the water. Elements that can cause deterioration and ultimately lead to leaks and ruptures.

Ruptures occur most often because a diver has put unnecessary and constant stress on a hose at the fitting. Rolling or coiling your regulator and hose to fit a dive bag, for example, can easily bend the hose against the fitting and cause crimping. The weight of a second stage, or a power inflator can also cause the hose to bend unnaturally and weaken.

Fortunately this potentially dangerous problem does have an easy solution. A sleeve hose protector slipped over the hose and fitting will keep you from inadvertently crimping the hose, and will spread the stress to prevent excessive bending.



Several companies market simple sleeves to slip over your hoses, but only Sherwood has made hose protectors a standard feature on all Sherwood regulators.

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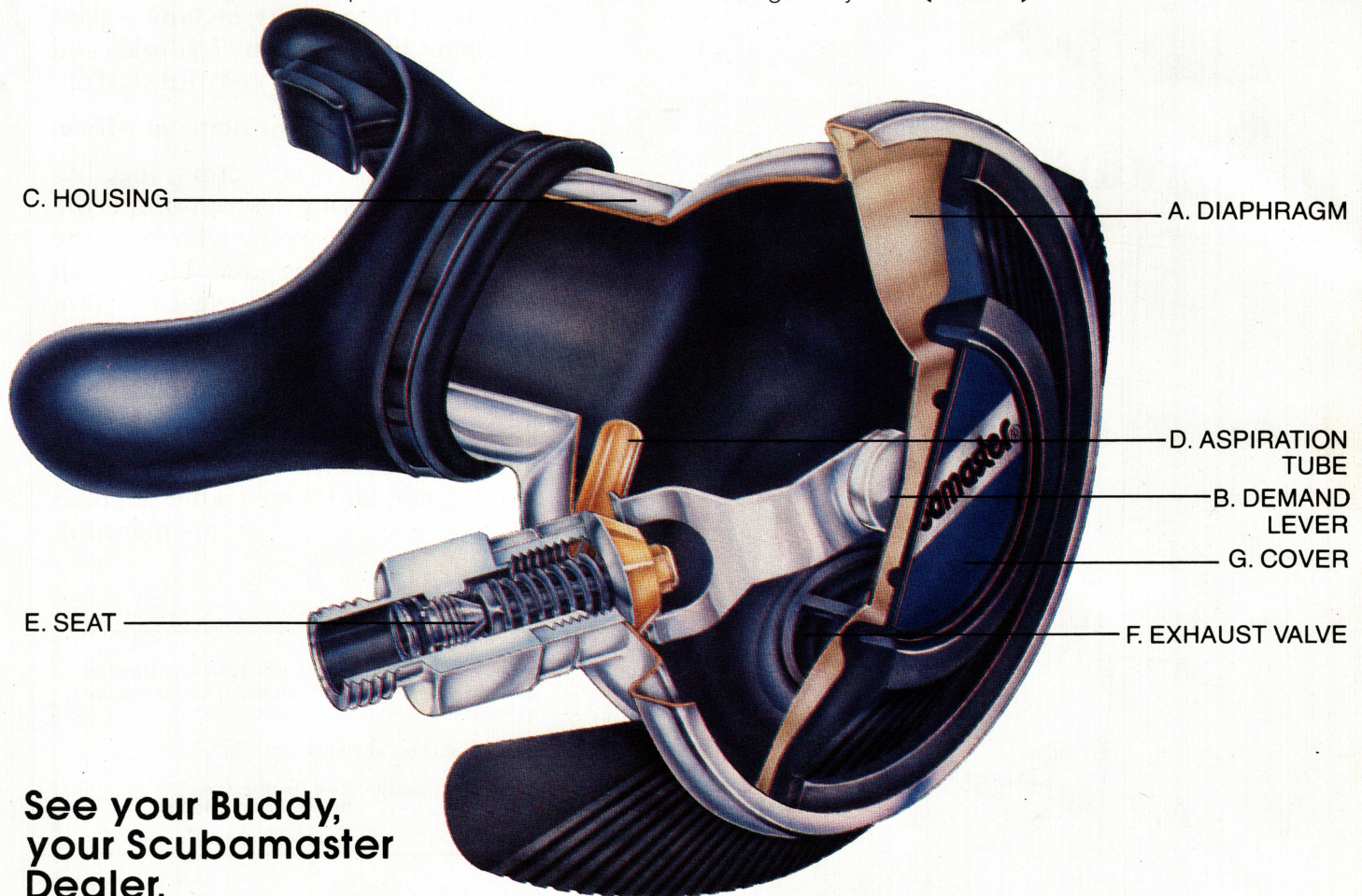
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Clownfish and Anemone

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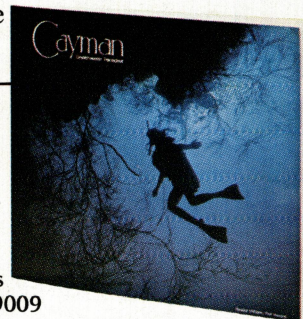
Captain Humann shares with the reader his intimate knowledge of the three Cayman Islands, acquired during his more than 3,000 dives. Complete with accompanying maps, this book discusses in detail the great diving spots to be found at Cayman.

Cayman—Underwater Paradise has universal appeal to ocean enthusiasts and divers, who have an appreciation for outstanding underwater photography. It is also a must for anyone with an interest in the Cayman Islands.

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KNOW HOW TO CUDDLE UP TO A FISH?

The master tells his secrets for super fish shots

in the October

skin diver



UNDERWATER FORUM

(Continued from Page 6)

how equally valuable historic wrecks are to be destroyed in the pursuit of profit and hobbies!

These historic resources belong to all the American people, and must be systematically evaluated and protected by qualified custodians, not by treasure-hunters and casual pot-hunting divers. Mr. Barada's generalization about "bureaucratic" archaeologists must also be mentioned. Any archaeologists working for state or federal governments produce reports that are easily available to the general public. The information obtained through fieldwork can thus be shared. Where are the records and reports of the treasure-divers? Except for the occasional sensationalism of a Spanish wreck, who learns about our heritage from the work of commercial salvors?

Second, although initial work in the field of marine archaeology was started by commercial salvors, they are by no means better qualified to do scientific research than are professional archaeologists. Perhaps Mr. Barada should study the fieldwork of George Bass, or Peter Throckmorton to update his knowledge in that area.

Third, Mr. Barada, by using the unique example of the Florida wrecks, sets up a false comparison between the novel, knowledge-seeking salvor, and the ignorant, bureaucratic archaeologist. The truth is probably somewhere between these two extremes. Sport-divers genuinely interested in our past can play an important role in future underwater research, but only if they are not alienated by rhetoric and exaggeration.

F. CORNMANN, JR.

W. ISLIP, NY

Where There's A Will . . .

I am writing in response to "No Dough" (April '79). Richard Evey wishes he had an answer to the prohibitive cost of diving. Perhaps he could use my method.

I am employed in a minimum wage job (\$2.90 per hour). It has taken me the better part of a year to gradually save enough money to purchase my equipment, most of which is used.

If you can afford to go out on the town one night a week, you can afford equipment for diving. It all depends on how much you want to dive and are willing to sacrifice to do it. In the meantime, equipment can be rented.

Right now I am saving for dive instructor school. It will take me three to four years to save enough. But, I want it and, as with my equipment, I will get it.

HENRY KRIEBEL

TRENTON, NJ



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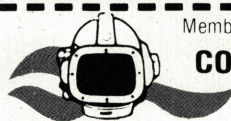
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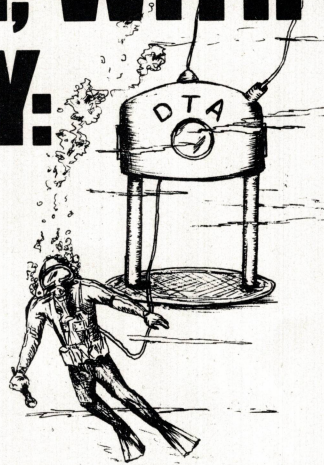
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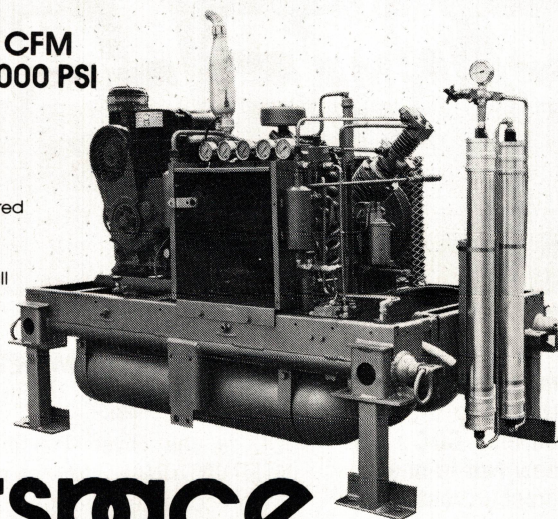
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UNDERWATER FORUM

Crafty Lobstermen

In the May U/W Forum James Albani states that the Plymouth, Massachusetts, nuclear power plant chases off the lobsters and invites sharks.

Now, I've lived on the seashore for a large part of my 30 years. Yet Mr. Albani has taught me something new.

You see, as a private pilot I've flown over the Plymouth plant in all seasons of the year. I've always noticed an incredible collection of what I've usually called lobster trap buoys in the Plymouth plant effluent.

Obviously those are not lobster trap buoys! They are *shark* trap buoys set out by those crafty Plymouth lobstermen.

HENRY GARDINER
WALTHAM, MA

Extremely Pleased

Several months ago I read a letter in U/W Forum from a diver complaining about the Holiday Inn in Grand Cayman. Many times people only take the time to write letters of complaint, and I want you to know that for one unhappy diver, I have had several hundred "hard-to-please" clients who have been extremely pleased with my choice of the Holiday Inn and the all-around good service we have received there.

I organize medical seminars to Grand Cayman on a yearly basis, and I always use the Holiday Inn. Prior to my first trip there I researched most of the hotels in Grand Cayman and concluded that the Holiday Inn, by far, met with my specifications for my groups. The physicians and their families expect comfortable and clean rooms, and a beautiful Caribbean beach atmosphere. The Holiday Inn certainly provides this with its clean pool and its spacious expanse of beachfront on the Seven Mile Beach. It offers casual and more formal dining, nightly entertainment and very hospitable service. I have found the staff always willing and able to assist my clients.

As for meeting facilities, there is a large air-conditioned room which easily seats 60 to 100 people with adequate tables and chairs. Projection and sound equipment is also available.

John McNeil is the vice president of the Grand Caymanian Holiday Inn, and anyone who has worked with him will verify that he is a very concerned and hard-working executive who does everything he can to see that all guests at the hotel are happy. This Holiday Inn is a privately owned hotel and you will find a personal and friendly atmosphere.

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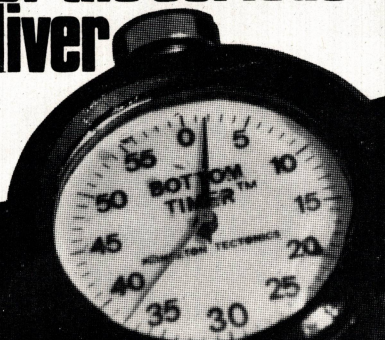
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UNDERWATER FORUM

Volcano Erupts

A disaster struck the island of St. Vincent, West Indies, in April of this year. A volcano, situated on the north end of the small island erupted and approximately 20,000 people (of the total population of 100,000) were evacuated to the already heavily populated south end.

Many homes were destroyed and the lush greenery that once supported and fed these people will take a long time to grow back.

On behalf of the residents of St. Vincent, I ask you to send a donation that will help alleviate some of the suffering. Checks payable to Dive St. Vincent, Ltd. (Relief Fund) will be channeled to the most needy.

R. J. MONTREUIL
Dive St. Vincent Ltd.
Box 864
St. Vincent, West Indies

Venomous Cones

In the June issue of SKIN DIVER (page 76) there is a discussion of the Glory of India cone. For the benefit of novice shell collectors it should be pointed out that these are venomous. There are 15 (of 400) species in the family Conidae, genus *Conus*, which can inflict human injury. *Conus textile*, *Conus geographus*, *Conus striatus*, and *Conus aulicus* have been known to cause human fatalities. These are found most commonly in tropical Indian and Pacific Oceans.

Cones with a textile color pattern and a bright red proboscis are the most dangerous. The venom is injected by a stinger near the proboscis. It is a good idea to wear gloves and not carry them in a pocket or bag against your body when collecting them. I would suggest interested readers contact the Environmental Information Division, Maxwell AFB, AL 36112, for more information on these cones.

ROBERT WILSON
ANCHORAGE, AK

Empire Mica

In the February issue of SDM you published an article on Florida's Panhandle — Diving the Miracle Strip. This May my dive club made a Gulf dive on the *Empire Mica*, one of the wrecks mentioned.

We left out of Indian Pass, west of Apalachicola, Florida. Our charter Captain, using Loran C, put us on top of the wreck in great time. We couldn't believe our eyes! The deck lies at about 70 feet and, from the surface, you could see it and everything in between. We had 100+ visibility, no surge, and every style of Florida marine life you could think of. For anyone looking for a great dive, the *Mica* is it.

JEFF NELSON
JACKSONVILLE, FL

Dive Lights

I read with interest your article on dive lights in the April and May issues of SKIN DIVER. Mr. Cozens accurately touched upon many fine points most individuals are not aware of or do not consider when buying a dive light.

I was disappointed on a number of counts however. For example, regarding buoyancy, no mention was made of the Captain Nemo lifejacket feature which we developed. Since this is a unique feature which no other manufacturer offers, I believe it should have been mentioned in the article. The lifejacket combines the best of both worlds. It provides the light, which is normally negative, with positive buoyancy so it will float, (insurance against loss). As the diver descends, the material compresses, loses buoyancy, and the light becomes negatively buoyant on the bottom (so the diver can put it down). The lifejacket also protects the bulb and battery from physical shock.

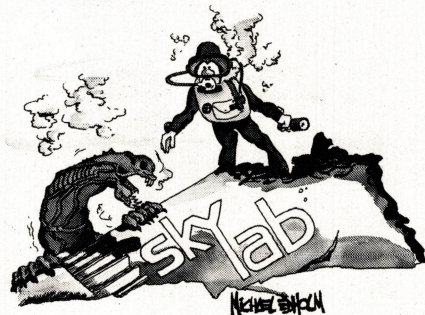
Mr. Cozens mentions the practice of taping switches to the off position or disconnecting wires to prevent accidental discharge. We pride ourselves in our switch mechanism... which will not go on or off accidentally.

Lastly, I was disappointed no mention of output was given for our optional superbulb which is suitable for deep dives with a burn time of 30 minutes. However, while the article was being written, we introduced a "Magnum" battery as an option. The additional amp/hr increases burn time to about 75 minutes (longer intermittent) which means two dives can be made with the standard bulb before the battery needs to be recharged. Burn time for the superbulb is increased to 45 minutes before recharging is necessary.

All in all I think Mr. Cozens did an excellent job in his article which should permit divers to select equipment best suited to their individual needs.

RANDALL ANDRONICA
U/W Specialty Co.
Brooklyn, NY

Because of the large number of dive lights (32) dealt with in George Cozens' two articles, it was impossible for SDM to include all the information available on each and every light. We attempted to give a concise survey of the lights available and enough information to enable our readers to choose a dive light wisely.
SDM Editors



It's easier to remember who we haven't taught to dive.

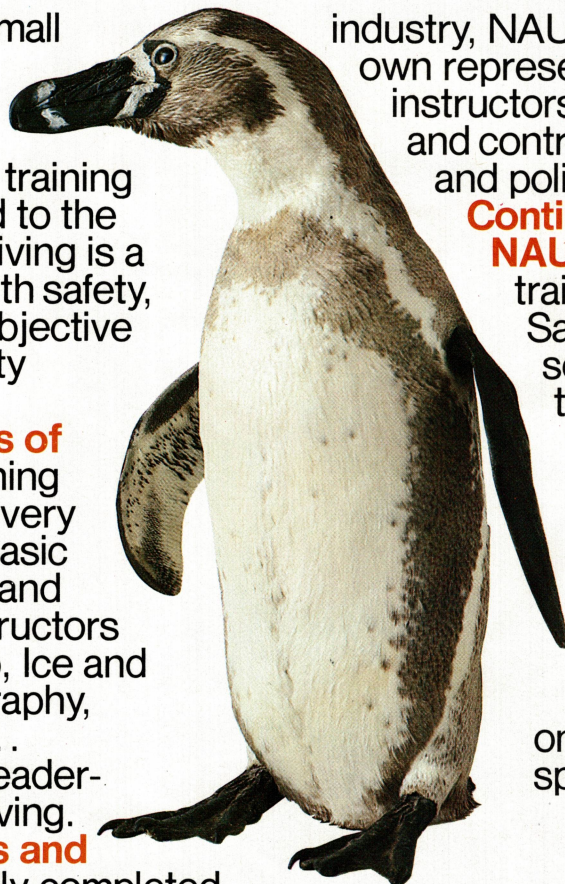
750,000 divers ago a small group of hand picked instructors formed what was to become the international giant of training organizations. Dedicated to the proposition that scuba diving is a fun sport when taught with safety, NAUI has achieved its objective by living its motto: "Safety Through Education."

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| ☐ Introductory Diving | ☐ Cave Diving |
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| ☐ Basic Scuba Diver | ☐ Diving Leadership |
| ☐ Sport Scuba Diver | ☐ Underwater Photography |
| ☐ Experienced Diver | ☐ Search and Recovery |
| ☐ Advanced Scuba Diver | ☐ Underwater Environment |
| ☐ Divemaster | ☐ Hunting and Collecting |
| ☐ Skin Diving Leader | ☐ Professional Diving |
| ☐ Assistant Instructor | |

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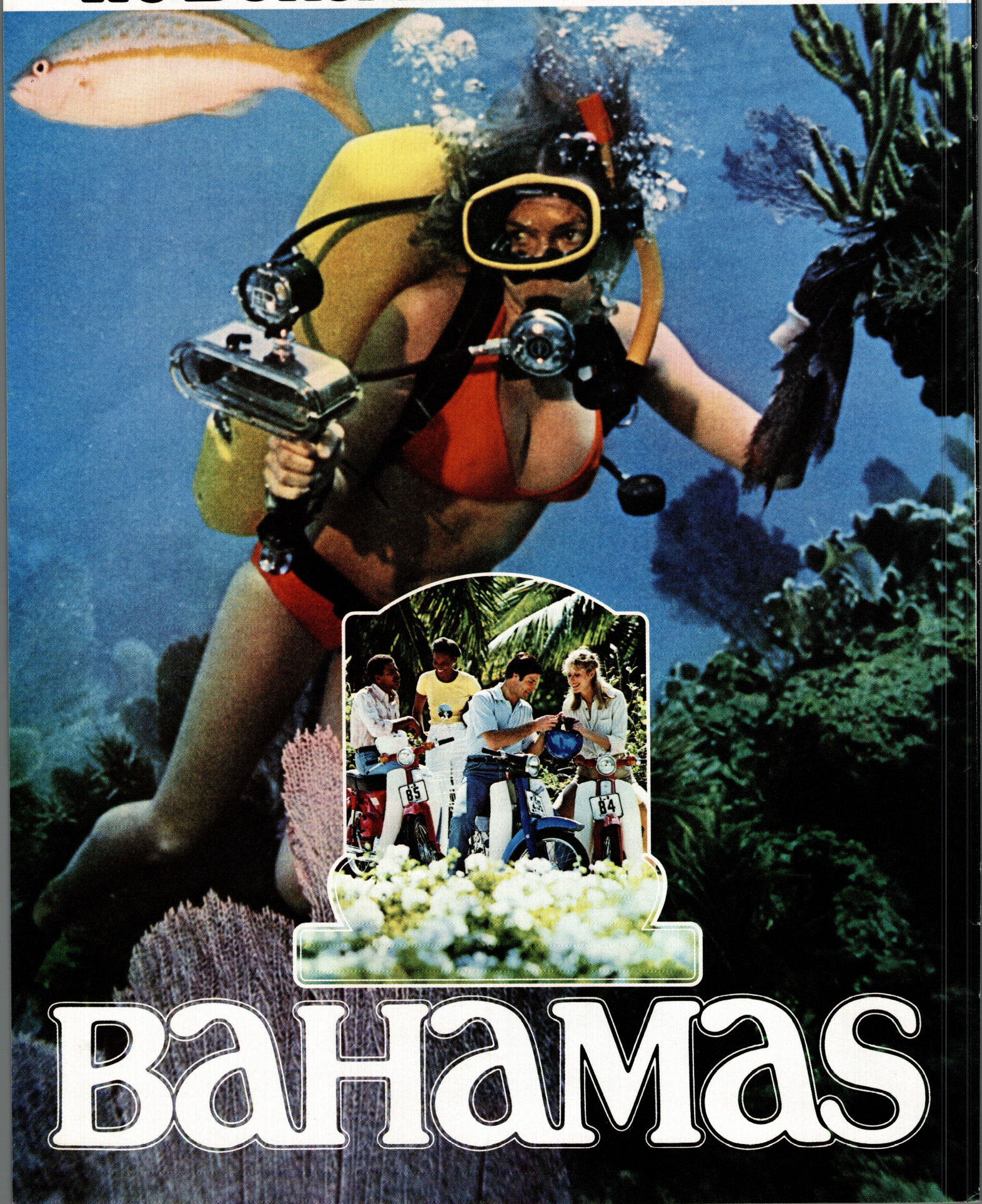
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Shows'n Events

September 1-3 Montana Divers Festival, Biological Station, Flathead Lake (Contact: Paul Elsenpeter, 618 - 3rd Ave., Laurel, MT 59044 (406-698-4904)

September 14-15 San Diego U/W Photographic Society's Annual U/W Film Festival, San Diego Civic Theater, 8 p.m.

September 14-16 NAUI Divemark '79, Ralph Waldo Emerson Inn, Rockport, MA (Contact: Dan Greenblatt, 29 Athens St., Cambridge, MA 02139)

September 15 2nd Vision 360, an Int'l Diving Symposium, State College, Buffalo, NY (Contact: D. Edmiston, Vision 360, PO Box 842, Buffalo, NY 14221)

September 29 NAUI Underwater '79 Fall Film Review, John Hancock Hall, Berkeley St., Boston, MA 8 p.m. (Contact: Fred Calhoun, PO Box 291, Back Bay Annex, Boston, MA 02117)

October 10 Deadline 9th Annual Innerspace Pacifica U/W Photo Competition (Contact: Innerspace Pacifica '79, PO Box 3061, Honolulu, HI 96802)

October 11-14 IQ-11, Shamrock Hilton, Houston. Exhibits, workshops, socials, demonstrations, lectures. Planet Water Film Show, 6:30 p.m. Saturday (Contact: IQ-11, PO Box 630, Colton, CA 92324)

October 13 Seamark '79, 5th Annual fund raising for Cotting School for Handicapped Children, New England Aquarium, Boston, 7 p.m. (Contact: Cotting School, 241 St. Botolph St., Boston, MA 02115 or (617-536-9632)

October 31 Entry deadline, Oregon Council of Diving Clubs annual underwater photo festival. (Contact: Jacques Stapper, 3508 Pettycoat Ln, Vancouver, WA 98660)

November 2-4 Ontario Underwater Council Fall Convention, Holiday Inn, Burlington, Ont. (Contact: Kim Barton, 80 St. Andrews Dr., Hamilton, Ont., Canada)

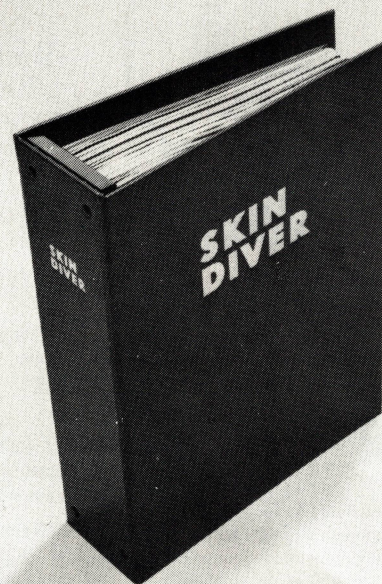
November 2-3 Innerspace Pacifica '79, Hawaii Council of Diving Clubs, Kaimuki High School Auditorium, Honolulu, 7:30 p.m. (Contact: Innerspace Pacifica '79, PO Box 3061, Honolulu, HI 96802)

November 9 Innerspace Pacifica '79, Wailuku, Maui (Contact: Innerspace Pacifica '79, PO Box 3061, Honolulu, HI 96802)

November 9-10 3rd Annual Rockford Divers Film Symposium featuring Rick Frehsee, Holiday Inn, South Beloit 8 p.m. (Contact: Bill Steinborn, 1385 Randall Dr., Rockford, IL 61108)

November 10 Innerspace Pacifica '79, Hilo, Hawaii (Contact: Innerspace Pacifica '79, PO Box 3061, Honolulu, HI 96802)

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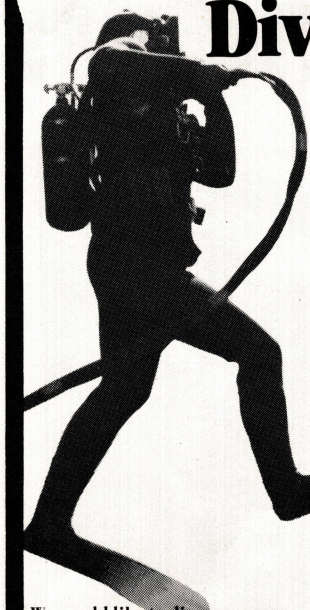
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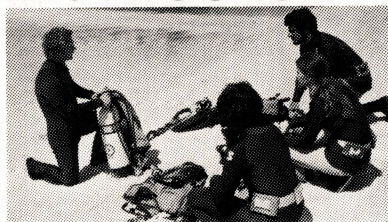
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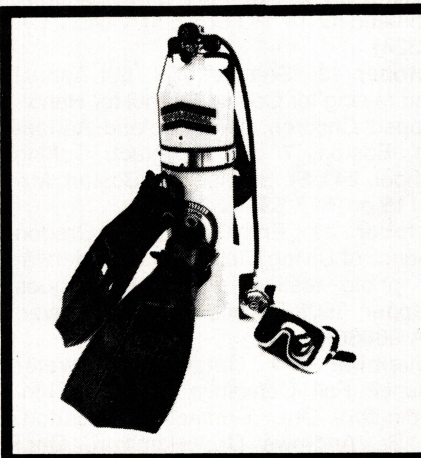
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Film Festivals 'n Symposiums

UPS: THE FIRST TWO DECADES

In September 1957, a dozen divers met in the Los Angeles home of Earl Shugarman to launch an organization dedicated to the promotion and advancement of underwater photography: the Underwater Photographic Society. Sport diving was in its adolescence at the time. Underwater photography was in its infancy.

Shugarman was elected president of the fledgling organization, followed in 1959 by Dr. Nelson Mathiesen, then Zale Parry. Remember Zale Parry? She was Mike Nelson's leading lady in several of the *Sea Hunt* episodes and became Hollywood's number one U/W stunt woman. In addition, Zale was an LA County instructor and a fine U/W photographer.

Together with SKIN DIVER Magazine and the LA County Parks and Recreation U/W Unit, UPS co-sponsored the first U/W film festival in December, 1957. The following year, the festival was combined with the first underwater photographic competition.

The Seventeenth International Underwater Photographic Exhibition will be presented by UPS on Saturday, October 27, 1979 from 5:00 to 10:00 pm at the Jean Delaclar Auditorium, Museum of Natural History, Los Angeles. The public is invited to watch the judging of prints, slides, and motion pictures which make up one of the world's most prestigious underwater photographic competitions. Winners in each category — slides, color prints, black and white prints — and motion pictures will be on display. Admission is free.

Through competition, diving, and exchange of ideas, UPS offers the diving photographer ample opportunity to improve his or her skills in this most demanding of underwater activities. Membership is available to anyone interested in underwater photography. For further information, contact membership chairman George Cozens, 4060 E. 60th Street, Huntington Park, CA 90255.

INNERSPACE PACIFICA

Innerspace Pacifica 79, a festival of underwater films, diving seminars and photo competition, will be held at Honolulu's Kaimuki High School Auditorium on November 2 and 3, 1979, with repeat screenings in Wailuku, Maui on November 9 and in Hilo, Hawaii on November 10.

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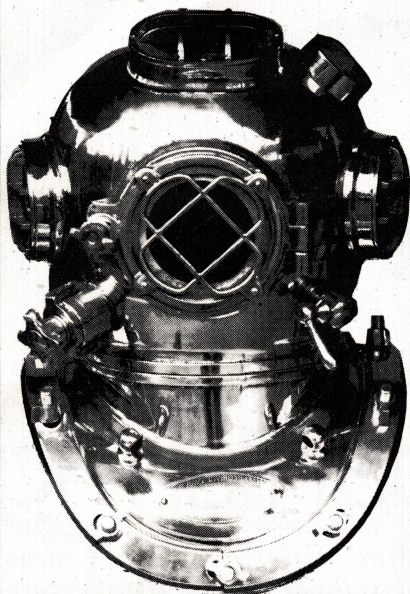
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FILM FESTIVALS

Sponsored by the Hawaii Council of Diving Clubs (HCDC), the festival will screen the same film program each night at 7:30 pm, in contrast to previous years when separate programs were shown.

In addition, the winner of the coveted Triton Award will be announced. Given to the individual who has contributed the most to diving in the Hawaiian Islands during the previous year, 1978's award went to former Hawaiian Malacological Society editor and master diver E. R. Cross of Aiea, Oahu.

For tickets, photo entry forms, Triton Award nomination blanks or further information, write: Innerspace Pacifica 79, P.O. Box 3061, Honolulu, HI 96802.

SAN DIEGO FESTIVAL

The San Diego Underwater Photographic Society has announced its 15th Annual Underwater Film Festival. This year's event will be held September 14



and 15 in the San Diego Civic Theater at 8:00 pm. Admission is \$5.50 per evening.

Master of Ceremonies for this year's festival will be Stan Waterman. Stan has been a leader and pioneer in the field of underwater cinematography for many years. His background in diving and education equip him to be an extremely entertaining and informative speaker. Among his many film credits are *Blue Water*, *White Death* and *The Deep*.

Each evening an entirely different program will be presented with films by such outstanding filmmakers as Lee Tepley, Jack McKenney, Stan Waterman and Ozzie Wissel. There will be films on a wide

range of subjects including whales, shipwrecks, sharks, the Red Sea, and even a talking garibaldi.

A special showing will be held for the Oceans '79 Underwater Technology Exposition at the Town and Country Hotel on Monday, September 17th. Master of Ceremonies for this special showing will be James Stewart, chief diving officer for Scripps Institution of Oceanography.

Tickets for this year's festival will be available at the Civic Theater box office and local dive shops. Or send your check to San Diego UPS, P.O. Box 82782, San Diego, CA 92138.

VISION 360

The second annual Vision 360 international diving symposium will be held on Saturday, September 15, 1979 at Buffalo State College, Buffalo, New York. The program will consist of two separate parts: the Underwater Symposium, 12:00 noon to 6:00 pm and the Underwater Film Show, 8:00 pm.

This year the Underwater Film Show will feature John Stoneman, a leading Canadian underwater filmmaker, who will present *The Fragile Sea* and *No . . .*, winner of the Miami International Film Festival gold medal. These films not only show the beauty of the ocean environment, but also its vulnerability. John will also show his film *Sea Nymph* and other selected features.

The Underwater Symposium will feature presentations on a wide range of topics including underwater photography, diving equipment, advanced diver training, and much more.

Tickets for each event are \$3.50 and are available in advance. For more information or tickets contact Dallas Edmiston, Director, Vision 360, P.O. Box 842, Buffalo, New York 14221.

U/W MEDICINE COURSE

The Underwater Explorers Society at Freeport, Grand Bahama Island will host its basic diving medicine training program November 10-17, 1979. The program offers a balanced approach: standard U.S. Navy diving medicine practices modified by the demands of the civilian sport diving community. The course encompasses eight days of classroom and practical treatment work including the use of the hyperbaric chamber.

The program is staffed by Dr. Edward S. Tucker, a former U.S. Navy diving medical officer and Assistant Director of the School of Submarine Medicine. Dr. Edward Landis, a specialist in pulmonary medicine with a wide and varied background in civilian sport scuba diving, directs the pulmonary program.

Interested physicians should contact Dr. Edward Tucker at 23 South Main Street, Essex, CT 06426. Or call (203) 767-1411.

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Channel Islands Dive Parties
Aqua-Ventures Diving School
2172 Pickwick Co.
Camarillo, CA 93010
Contact: Logan (805) 484-1594

Underwater Pumpkin Carving Contest

October 27, 1979

Cassotta Diving
4930 Pacific Street
Rocklin, CA 95677
Contact: John (916) 624-0422

Fall Beach Parties

Divers Den, Inc.
22 Anacapa Street
Santa Barbara, CA 93101
Contact: Howard (805) 963-8917

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Divers - Manufacturers Workshop "Wetsuits"

September 13, 1979

"Diving the Red Sea" with Chip Cooper

October 11, 1979

Innerspace Diving Supply
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FLORIDA

Labor Day Beach Party at Diver's Point

September 3, 1979

Halloween Costume Night Dive and Beach Party

October 31, 1979

Divers Unlimited
4231 Hollywood Boulevard
Hollywood, FL 33021
Contact: Dave Stancle
(305) 981-0156

Fort Lauderdale Photographic Society (FLUPS) Meetings

September 14, 1979

October 12, 1979

November 9, 1979

Lauderdale Diver
1334 S.E. 17th Street
Fort Lauderdale, FL 33316
Contact: Flupper (305) 467-2822

"Name a Reef" Drift Dive - You Find It, You Name It!

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Professional Diving Schools of Florida
1540 N. Federal Highway
Pompano Beach, FL 33062 OR
Bahia Mar Hotel and Yachting Center
Ft. Lauderdale, FL 33361
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(305) 761-3413

GEORGIA

Underwater Archeology Seminar with Dr. Newell Wright

September 25, 1979

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Valdosta, GA 31601
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ILLINOIS

Women in Diving Seminar

September 15, 1979

Underwater Film Festival

October 12, 1979

Berry Scubatech
12003 S. Cicero
Alsip, IL 60658
Contact: Joseph (312) 371-3366

INDIANA

Fall Hog Roast

Midwest Scuba Center
9508 Ross Lane
Indianapolis, IN 46268
Contact: Louis (317) 299-2522

MARYLAND

Oyster Chase & Festival

September 22, 1979

Dynamo, Inc.
8906 Rhode Island Avenue
College Park, MD 20740
Contact: Fred (301) 345-DIVE

NEW HAMPSHIRE

New Year's Eve Ice Dive

December 31, 1979

LaPorte's Skindiving Shop
Box 53, Route 103
Newbury, NH 03255
(603) 763-5353

NEW YORK

Underwater Film Festival

February 24, 1980 3:00 PM

Niagara Scuba Sports
2048 Niagara Street
Buffalo, NY 14207
Contact: Don Benz
(716) 875-6529

NORTH CAROLINA

Fall Diver's Dam Open House

Scuba World, Inc.
4732 South Boulevard
Charlotte, NC 28210
Contact: Jay (704) 523-1657

OHIO

Diver's Slide Show Festival—Free!
September 29, 1979

Diver's Paradise
2511 N. Reynolds Road
Toledo, OH 43615
Contact: Karen Wood
(419) 535-6828

OREGON

Film Festival—Roatan and Northwest Diving

October 12, 1979

Oregon Diving Schools
1790 Center N.E.
Salem, OR 97301
(503) 363-1731
1677 Coburg Road
Eugene, OR 97401
(503) 344-3483

SOUTH CAROLINA

4th Annual Muscular Dystrophy Dive-In

September 1, 1979

Underwater Works, Ltd.
1023 Bush River Road, No. 7
Columbia, SC 29210
Contact: Susannah
(803) 798-3723

TENNESSEE

"Dive to Adventure" with Jack McKenney

September 7, 1979

Currit Interprises
600 Magnolia Avenue N.E.
Knoxville, TN 37917
Contact: Charles (615) 522-6794

TEXAS

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March 1 & 2, 1980

Aqua-Trek, Inc.
804 University Boulevard
Galveston, TX 77550
Contact: Jinks (713) 763-0456

1st Annual Sun Country Underwater "Scuba Rodeo"
September 8 & 9, 1979

Southwest Scuba Divers
1665 Lomaland Drive
El Paso, TX 79935
(915) 593-0250

WISCONSIN

Caribbean Film Festival

September 15, 1979

Deep End Scuba Training Center
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Fond du Lac, WI 54935
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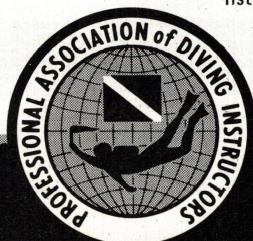
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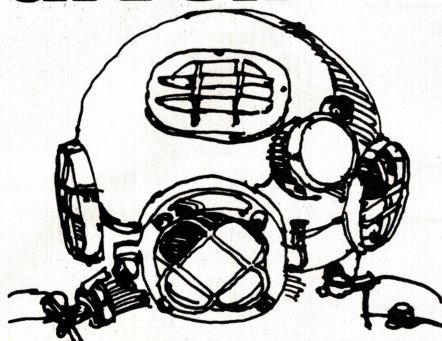
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FLORIDA LOBSTER SANCTUARY

In the final days of its 1979 session, the Florida Legislature created a 150,000 acre nursery-sanctuary for spiny lobsters in south Florida's Biscayne Bay. Sponsored by State Senator Robert W. McKnight, the preserve proposal was the brainchild of Marine Wilderness Society president Alexander Stone, who worked on its passage for two years.

"In this sanctuary it will be illegal to catch, possess or molest spiny lobsters," said Alexander Stone. "Ninety-five percent of all lobsters in the bay system are juveniles under legal size. This law will permit them to reach legal-sized maturity without the growth slowdown and increased mortality rate caused by handling-related injuries. The result will be greater numbers of lobsters reaching adulthood faster," concluded Stone.

Because these protected lobsters will migrate out to the reef system after reaching legal size, the Marine Wilderness Society is confident that the new law will increase the adult lobster population on the Florida Reef Tract and help this overharvested species to recuperate.

More information on this and other conservation projects is available by writing the Marine Wilderness Society — a national membership organization dedicated to the protection of our living seas from overexploitation, pollution and abuse — at P.O. Box 943, Miami, Florida 33165.

SHARK SHRINKS

History's largest shark has shrunk. The jaw that was believed to hold six grown men, in fact, would hold only a couple. Now according to an article in Sea Frontiers magazine, the jaw of the largest shark that ever lived has been accurately recreated and publicly displayed.

In an article by Robert E. Hueter, the reconstructed jaw is reported to be fashioned after fossils of the ancestor of the great white shark. The exhibit, which is permanently displayed at Planet Ocean in Miami, was created by Dr. C. J. Jeremiah of Jacksonville with replicas of the actual teeth of the ancient *Carcharodon megalodon*. Those teeth were taken from rocks 25 million years old, dredged up for the bottom of the St. John's River near Jacksonville.

The largest discovered teeth of the ancient shark have enamel heights of about 4½ inches, indicating the animal reached a maximum length of close to 45 feet. According to the article, for most of the century conjectures of 60 feet or even 100 feet or more have been commonplace. Scientific pitfalls resulted in the famous but exaggerated jaw in the American Museum of Natural History.

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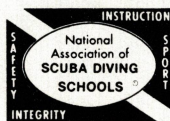
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THE SOURCE



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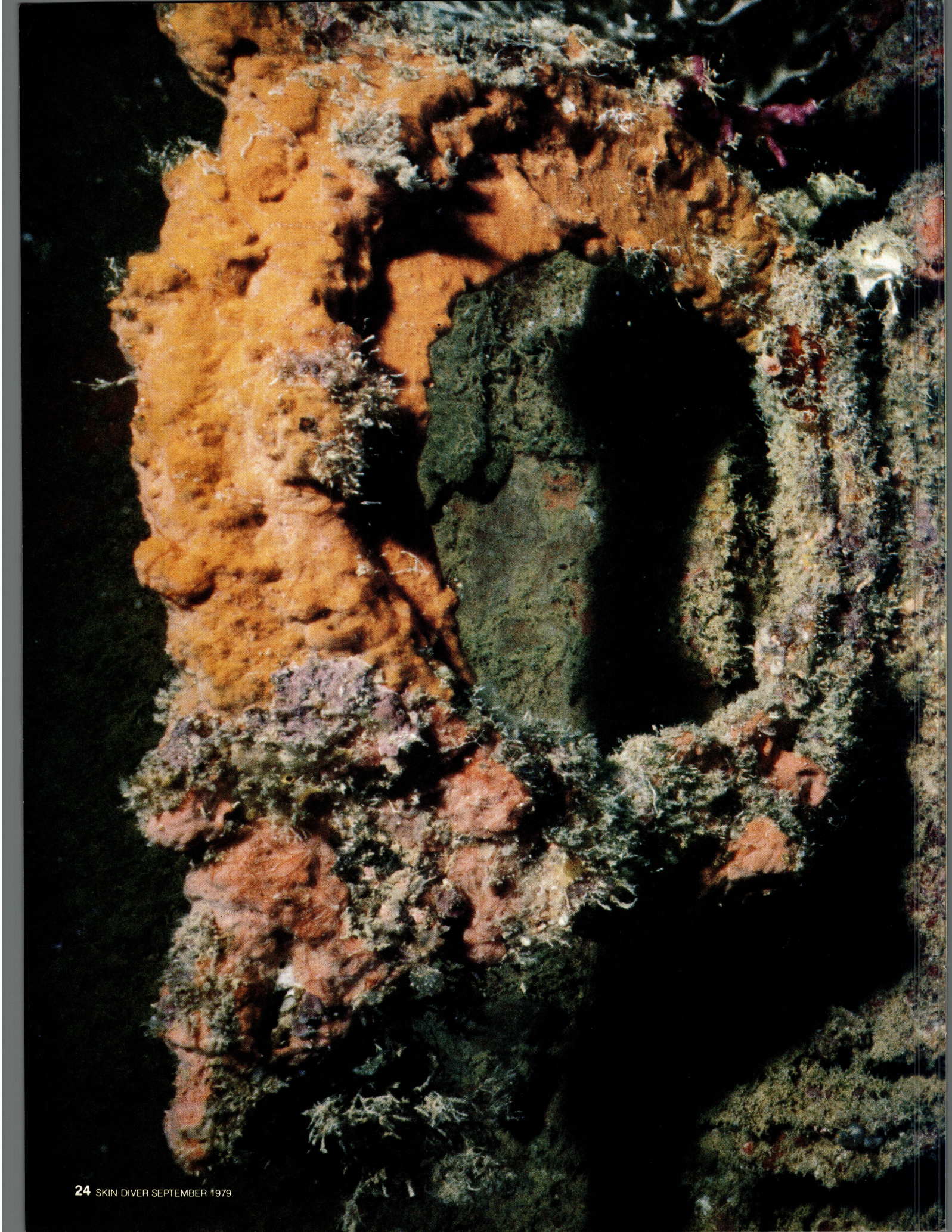
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The purpose of this article is to present the basic techniques of U/W wreck photography, with special emphasis on the sunken Japanese ships which rest on the bottom of Truk Lagoon.

PLANNING THE TRIP

Before making your airline reservations for that dream trip to Truk, do your homework first. Learn about the U.S. Naval air attacks (Operation Hailstone) which sank the ships, examine maps of the area and descriptions of the ships, and find out about the living and diving accommodations available. You can obtain this information by writing to the sources at the end of this article.

TIPS ON PHOTOGRAPHING GIANT SHIPWRECKS

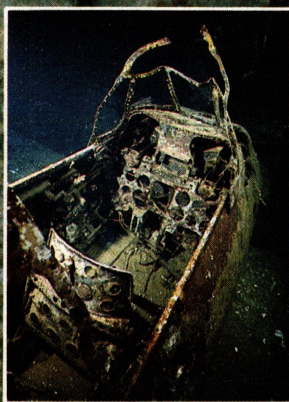
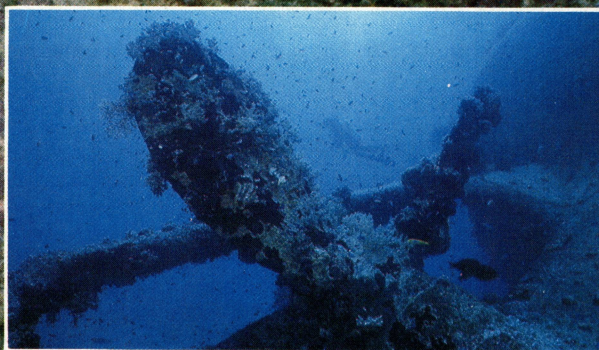
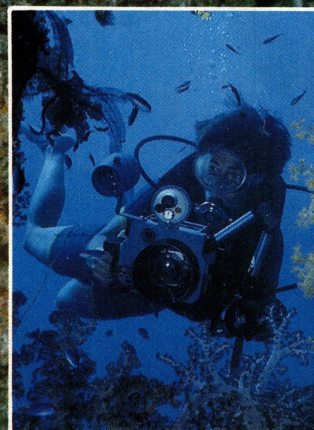
RESEARCHED IN TRUK LAGOON

Text and Photography by Jim and Cathy Church

Also, before or after your arrival at Truk, purchase a copy of *Divers' Guide to the Truk Lagoon* (1978, Rosenberg & Graham, \$6). This helpful, 56 page booklet contains a historical summary, and a map showing the locations of 24 sunken ships and 4 aircraft. It gives the silhouettes of the ships, line drawings of the aircraft, and the specifications of each, as well as details which are of interest to U/W photographers. Copies are available at the Micronesia Aquatics dive shop (P.O. Box 57, Truk Lagoon, ECI 96942).

Traveling with a group can be advantageous — a group has more clout if there are more divers than available boats and tanks, and an experienced group leader can be worth his weight in gold. However, if you are the only U/W photographer in a group of sightseers who want to see a new wreck on each dive, the trip could be sheer hell for you. Traveling alone (or with just enough people to fill one small boat) gives you greater flexibility, but you could waste a lot of time and expense just learning the ropes.

Bring plenty of film! We recommend Ektachrome 200 for camera-to-subject distances of about three feet or more.



This gives almost twice the depth of field as ASA 64 film, and may help you get better optical performance from your lens. Most lenses (including the Seacor 21mm and Novatek 20) have better resolving power at the middle range of stops — from about f8 to f16 — than at the wider stops. For close-up and macro work, Kodachrome 64 is great for strobe exposures, but we favor Ektachrome 64 whenever a bluewater background is desired. Film may be available at your hotel at Truk, but you don't know its storage history, and it will often be for color print film or 110 cameras.

Be prepared for photography in a humid, tropical climate. Unopened film can be safely stored in your air-conditioned room, but exposed film should be protected from high humidity as well as from heat. Store exposed film in an airtight container in which a desiccant material has been placed to absorb moisture. We prefer the desiccants which have an indicator dye which turns from blue to white when the desiccant has reached its saturation point.

PLANNING THE DIVES

You may be diving from small, crowded boats which can give a rough ride if the sea is up. And if the boat trip is long, your guide may take the boat to an island beach for lunch and a three to four hour surface interval before the afternoon dive. Therefore, you may have to plan for an entire day rather than a single dive.

Pack your camera in a padded carrying case to protect it from sun, jostling and impacts with dive gear. If you have a backup strobe, connector adaptor, or other spare equipment and tools, bring them along. Be prepared for sudden weather changes — a "space age" blanket can keep you warm if chilled, protect you or your equipment from intense sun, or can provide an effective cover during film changes.

Some of the diving may be consistently deeper (50 to 100 feet) than you are accustomed to doing — especially if your group does two deep dives each day. Carry a decompression table in your BC pocket, wear a Bottom Timer and keep track of depths and times. The single, one-person decompression chamber at Truk is said to be most uncomfortable.

Above all, bring a hat and protective sun cream if you burn easily!

PLANNING YOUR PICTURES

Begin by finding out what ship (or ships) you will be diving on the following day, and if you will be repeating these sites. Review the information you have about these ships and pinpoint those specific features which will fit your lens and shooting plan. If you will only dive a certain ship once, concentrate your efforts on the strongest feature of the ship which fits your needs. As examples, with

only one dive on the *Dai Na Hino Maru*, we would concentrate on the bow gun; and with only one dive on the *Gosei Maru*, we would concentrate on wide-angle shots of the propeller.

Other ships, such as the *Shinkoku Maru* and *Fujikawa Maru*, are so large, and present so many opportunities for U/W photography, that your group may opt to dive these wrecks three or four times. The *Shinkoku*, for example, is 500 feet long — and the bow, mid-ship and stern sections can be considered as three separate dive sites! Given four dives on the *Shinkoku*, you might plan your dives as follows: An exploratory dive to get an overview of the ship's superstructure; two dives for wide-angle and medium-distance shots; and one dive for close-ups.

The key idea is to plan your shots to take the best advantage of your subjects. But always have an alternate plan! You never know if the weather will change, if other divers will crowd into your working area, or if your strobe will fail and force you to work with natural light.

WIDE-ANGLE SUBJECTS

A wide-angle lens is best for establishing shots — pictures which will give the viewer a feeling for the massive bulk of a ship. While you can't show an entire ship in a single picture, you can shoot shots of selected parts of the ship which will convey the feeling of vastness. Some typical wide-angle setups are listed below:

1. Pictures of a ship's mast or a kingpost, taken while looking upward from the deck, may produce the desired effect. The sheer bulk of the mast implies the bulk of the ship.

2. Upward camera angles which show the railings of upper decks, and the ladders leading up to these decks, also imply bulk.

3. Shots taken outward through an open hatchway (doorway) are also effective if an expanse of decking and topside equipment is shown in the distance.

4. Propeller shots can also emphasize the huge size of a ship. A shot of the large, four-bladed propeller of the *Gosei Maru* — with the rounded stern in the background — may be the picture you need.

5. The large guns at the bows and sterns of many ships also emphasize the great size of ships.

6. Interior shots, such as those taken on a ship's bridge, and which show the engine room telegraphs and the ship's helm, can also be effective establishing shots.

A distant diver in the background can often add important size perspective to establishing shots. But shoot a few without the diver to use as ending scenes for slide sequences.

WIDE-ANGLE LIGHTING

Your best wide-angle long shots are

often best taken with natural light, and with shutter speeds faster than 1/60 second to sharpen the images. But whenever you are aiming upward toward a bright sun, bracket toward the wider stops because your meter could lead you to underexposure.

For your closer, wide-angle shots, use strobe fill to accent colors and detail, or to provide the primary light for the exposure if conditions are dim. A single wide-beam strobe can be held above the camera, and aimed downward at an angle to the subject, to spread the beam over the entire picture area. And if the camera is tilted for a vertical format, the strobe can be aimed in from one side.

Because the strobe is often aimed in from the upper left side of the picture, this side lighting produces a dark area on the far right side of the picture. One solution to this problem is to use two wide-beam strobes, mounted at left and right of the camera. However, in bright conditions, the master strobe may not trigger the slave strobe because the sunlight overpowers the strobe light reflecting back to the sensor of the slave strobe.

Two-strobe lighting is often required for wide-angle photography in dark conditions when the strobes provide all of the light for the exposures. As examples: When photographing the large, 18 inch diameter shells piled in the hold of the *Yamagiri Maru*, two wide-beam strobes were needed to cover the picture area of our Nikonos 15mm lens. And when photographing a Zero fighter in the hold of the *Fujikawa Maru*, two strobes were needed to light both the interior and exterior of the cockpit.

MEDIUM-DISTANCE SUBJECTS

Use a Nikonos 35mm or 28mm lens, or the normal lens of a housed camera, to move in and isolate specific subjects. These can be used as follow-up shots to your wide-angle establishing shots. Some examples are given below:

1. An open porthole, ship's helm, engine room telegraph or other identifiable part of the ship's equipment can be used to accentuate the details of the ships in your slide show.

2. A head-and-shoulders diver portrait can portray exploration. Placing your model between the cargo booms of the *Fujikawa Maru* can provide a beautiful setting. Have your model wear a red BC to match the red in the soft corals which grow outward from the booms.

3. Photographs of unexploded munitions — clips of machine gun bullets in the hold of the *Sankisan Maru*, a close-up of the Zero fighter cockpit in the hold of the *Fujikawa Maru*, or a diver posing with a depth charge on the stern of the subchaser/destroyer *Susuki Maru* (identification uncertain) can portray the overtones of war.

4. Lastly, photographs of china, cook-

ing utensils and human remains can emphasize the fates of some crew members.

MEDIUM-DISTANCE EXPOSURES

Expose for the lighter corals as you would for light skin tones and bracket toward the higher-numbered stops to avoid overexposures. For diver portraits with these corals, try using a sunlight exposure with the strobe held back to the fill position for light skin. If your model happens to have dark skin, remember that you must expose for the brightest area with color slide film — the reflective coral.

Dishes, cups, bowls and tiled bathtubs are highly reflective. Avoid front lighting which produces glare and reduces shadow details. A pile of dishes can blend together and produce a "blah" picture. Use side lighting to create some shadows and to avoid illuminating the suspended particles of silt in the water.

With single-strobe lighting, keep the strobe far enough away so that the strobe-to-subject distance is greater than the width of the picture area. This will help prevent the light intensity across the picture from falling off too harshly on the far side. With a two-strobe system, have the fill strobe about one stop weaker in intensity than the main strobe. Its job is to soften the harsher shadow details of the main strobe. Bracket toward the higher-numbered stops with reflective subjects.

Other artifacts, such as gas masks, human remains and other non-reflective subjects, may be covered with a dark growth or brownish silt. Bracket toward the lower-numbered stops to avoid underexposure. Because these subjects are less reflective, the shadow areas will often be darker in your pictures than you had expected. A second strobe for fill lighting is well worthwhile.

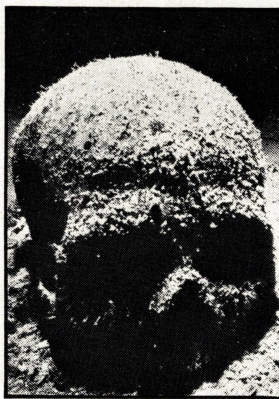
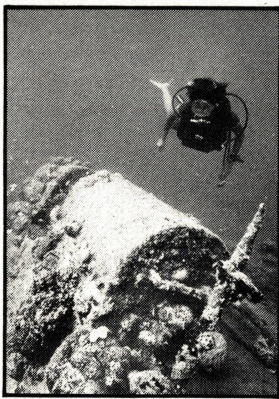
CLOSE-UP AND MACRO SUBJECTS

The marine growth encrusting the ships, as well as the smaller artifacts on and within the ships, provide ample opportunities for close-up photography. Some of the subjects, and the problems and techniques of photographing them, are given below:

1. Clusters of solitary corals are good subjects for a 1:3 extension tube, and are best photographed when the polyps are open. Look for them in shaded areas where their tentacles can reach the food-carrying currents — areas such as the undersides of gun barrels or ship's rigging.

2. Soft corals can be tricky to photograph because their colors vary greatly. The deep red corals require much more light for an exposure than do those with thick, white stalks. Bracket your exposures accordingly.

3. Some of the corals and alcyonarians are white or gray, and this lack of bright coloring can lead to dull close-ups. There are few brightly-colored sponges such as



you would find on a Caribbean reef. Don't waste time with dull subjects.

4. Crinoids (featherstars) are usually found on the upper edges of wreckage where they can extend their arms into the current. Look for those with bright colors. Because many close-ups have black backgrounds, a black crinoid can easily "disappear" in your pictures.

5. Many of the beautiful fish of the Pacific are difficult to approach! But one photogenic exception is the clownfish. They are often living with an anemone, and they are excellent subjects.

6. Close-ups of teapots, dishes and even skulls can be taken to add drama to your slide show. These, and other such artifacts, are best taken with a close-up lens having a picture area of about 18 x 18 inches, and often with a single strobe aimed downward from over the subject.

WORKING INSIDE THE WRECKS

Working inside some of the darker passageways, compartments and holds can be compared to night diving. Camera settings are hard to see, and SLR systems difficult to focus, when your eyes must adjust to darkened interiors. Therefore, plan to use some night photography techniques.

Attach a small light to your strobe to help with the aim, and to illuminate subjects for SLR focusing and viewfinding. Whenever possible, preset for the estimated focused distance and aperture before entering the compartment. Practice adjusting the aperture control by the feel of the click stops ahead of time so you can bracket exposures in the dark.

The floors inside many of the passageways and compartments are covered with a layer of fine silt which may be a foot or more deep. The slightest kick of a fin, the currents generated by your body movement and bubbles, or a pressure gauge or octopus regulator dragging below you can stir up an U/W cloud of silt which makes both visibility and U/W photography difficult.

The overheads, however, are much cleaner in the more frequently visited compartments — most of the loose silt having been cleaned off by the bubble

streams of dozens of previous divers. Therefore, if you adjust your BC so it keeps you up off the deck — up closer to the overhead — you can often move slowly through the interior of a wreck with a minimum amount of stirred-up sediment. But a word of warning: Beware of twisted piping and entangling wires which hang from some overheads.

Some tour guides have "salted" the upper compartments (the safer, well-lighted ones) with dishes and other artifacts. These have often been placed near a hatchway so you can photograph them without completely entering the compartment. Simply use your BC to raise your torso off the bottom, wedge your legs or ankles inside the hatch opening to hold yourself steady, and shoot.

FOR MORE INFORMATION

The following agencies assemble dive trips to Truk Lagoon. Write to them for brochures:

1. Bay Travel, 2435 East Coast Highway, Corona Del Mar, CA 92625.
2. Sea Safaris, P.O. Box 512, Manhattan Beach, CA 90266.
3. Scubamerica Tours, Box 9000, Van Nuys, CA 91406.
4. See & Sea, 680 Beach St., Suite 340, Wharfside, San Francisco, CA 94109.

If you are forming a group, and wish to engage an experienced guide to handle the details of diving and accommodations at Truk, we can recommend Wayne Baumunk, Manager of the Coral Reef Marine Counter (P.O. Box 2792, Agana, Guam 96910).

If you are traveling to Truk independently, some important contacts are:

1. Blue Lagoon Dive Shop, Box 429, Moen, Truk ECI 96942.
2. Micronesia Aquatics Dive Shop, Box 57, Moen, Truk ECI 96942.
3. Truk Continental Hotel, Moen, Truk ECI 96942.

And when you arrive at Truk, stop at the police station for a diver's permit. You must present your certification card and pay a \$2 fee. You will also be warned that collecting any artifacts from the wrecks is punishable by a fine and prison term. Photograph, but don't take! ➤

Medifacts

BY CHARLES V. BROWN, M.D.

EMERGENCY ASCENTS

David Smith writes from Arabi, LA to enquire whether we think it is OK for a basically trained diver to practice emergency swimming ascents. If so, from what depth should he begin?

Answer: Now there's a question to set groups at odds, and alienate buddies. In 1976 the Underwater Medical Society convened a NOAA sponsored workshop to answer it. Authorities abounded and the fur flew, but nothing resembling unanimity emerged.

The roots of the controversy go back many years to when someone realized that the air embolism which sometimes followed real emergency ascents was caused by breathholding. Trapped air expanding in accordance with Boyle's Law would tear lung tissue and enter the bloodstream. Soon instructors were exhorting their students to always exhale during ascent. But occasionally, while practicing that skill, students embolized anyway. Naturally, a clamor arose in opposition to so-called free ascent practice.

My own opinion is a definite yes, do

practice. Here's why. Nothing in a person's past experience prepares him to part with precious lung air when making an emergency out-of-air ascent. On the contrary, instinct and any experience with underwater swimming dictate that he must hold his breath. He knows better, because teacher told him. But in a panic situation learning evaporates and instinct takes over. If we expect anti-instinctive behavior to prevail, it had better be thoroughly practiced — to the point of becoming a reflex response.

The prospect of embolizing during practice is indeed frightening, but we believe a simple precaution will remove the risk: *don't* exhale during ascent! Leave the lungs at normal resting volume, and let the expanding air vent out of its own accord.

In our view, the problem arose because students taught to exhale during ascent misunderstood their instructor's meaning. He only wanted to see air coming out. But to the student, exhaling meant contracting the chest to push air out. This compresses the lungs, and actually collapses some of the small airways, causing localized air trapping in the alveoli they serve. That's why some have embolized.

We recommend leaving the regulator in the mouth. In a real out-of-air situation, more air becomes available from the tank as one ascends and ambient pressure drops. During practice runs, breathing

can be immediately resumed if the need is felt. Naturally, practice runs should be normal in all other respects. The standard one foot per second rate should be used, and the head should be tilted back so the diver can see where he's going.

The premise that free ascent can be taught and practiced safely has much substantiation. Many individual instructors have taught it for years with nary a problem. During World War II about 20,000 ascents were conducted in the New London submarine escape training tower without incident. The British Sub Aqua Club reported 15,000 ascents without embolism. We are familiar with many divers who routinely remove their regulators during ascent just for practice; none has suffered.

We feel that practice should begin with the student's very first scuba experience, since that's when the need for the skill is greatest. To provide a safety margin for potentially less stable students, one might start in the shallow end of a pool, and progress deeper only as confidence is gained.

FUEL AND FITNESS

Commenting on our reply to the "endurance drink" letter (SDM March '79) Dr. T. M. Bell of Salem, Oregon emphasizes the importance of physical conditioning for protection against cold. The well conditioned person has more mitochondria — intracellular chemical plants where

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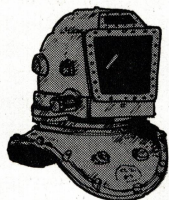
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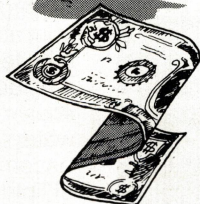
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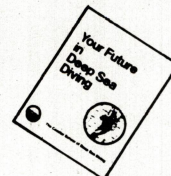
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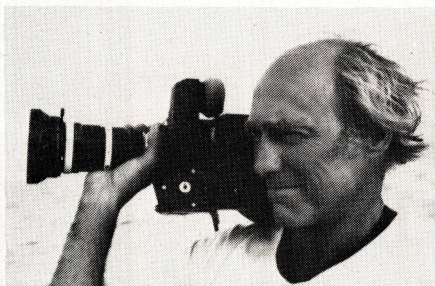
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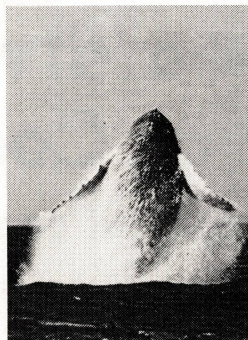


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MEDIFACTS

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Blood sugar (glucose) is burned preferentially when its level is high enough. With cold stress or exertion, blood sugar cannot for long supply the increased demand for energy, and fatty acids delivered from fat storage cells become the main fuel. The large metabolic furnace capacity in fit divers is a distinct advantage in maintaining body temp during cold exposure.

We might add that unfit fatties are not without advantage. Because of their body shape and the excellent insulating properties of blubber, they usually last longer in cold water than lean, fit types.

BRAIN STRAIN

From Suffern, New York comes a query about something with the brain straining name of idiopathic membranous nephropathy. This loosely translates to "a disorder of kidney membranes of unknown cause." Our problem is that the person who has it is enrolled in a diving technology course. He's concerned about whether diving will jeopardize his health, and his doctors can't say.

Answer: Idiopathic membranous nephropathy is not common, but not terribly rare either. With it, blood albumin drops because the kidneys spill it into the urine. Albumin is the blood protein most important for maintaining the osmotic pressure gradient that prevents too much water from moving out of capillaries into tissue spaces. When it is deficient, the tissues swell. A second abnormality that develops is elevation of cholesterol and other blood lipids.

Patients with idiopathic membranous nephropathy are generally not restricted from athletics — they can tackle anything they feel up to. Whether this permissive attitude should extend to diving is not known, but we have misgivings. Loss of water from blood to tissue is a feature of decompression sickness, and elevation of lipids favors coagulation (another feature of decompression sickness). We're concerned about a possible predisposing or aggravating effect. Furthermore, the disease tends to progress slowly with time, and complications such as hypertension may occur. At this stage of our knowledge we would advise that people with idiopathic membranous nephropathy not become professional divers. If they take up sport diving, they should avoid table limits and ascend at slower than normal rates.

(Continued on Page 34)

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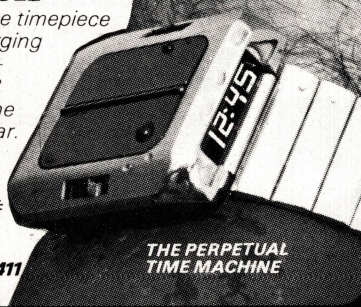
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THE NEW **SCUBAMASTER
REGULATOR**

By Sharon Saunders

It took a lot of courage for Scubamaster, a new company, to make its entry into sport diving with the Model 1687 regulator. Jumping in against at least three other established manufacturers this year and producing a very good regulator is quite an accomplishment.

Performance in regulators is generally a combination of breaking effort, flow rate and exhaust resistance. To the average diver this means the force necessary to open the demand valve, the amount of air that flows through it and the effort it takes to exhale each breath.

Overdesign has caused the need for more maintenance than most divers are willing to live with, requiring later modification. Uneven performance has also been a problem: At depth, under stress, the regulator will perform like a champ, but in shallow water it may be too sensitive — resulting in free flow.

The Scubamaster 1687 doesn't use any tricks to achieve its level of performance. It is a balance of new materials and refinement of proven design principles that make it an excellent breathing machine. Cosmetically, its second stage case is a pleasing variation of what appears to be a conventional regulator. The diaphragm cover is a single piece of molded neoprene, which allows purging even when wearing cold water "lobster paw" gloves. It is held on with a snap ring and can be removed with a key or coin.

Underneath is a silicone diaphragm. Scubamaster has had a new compound of silicone mixed to its own engineering specifications and its diaphragm is one of the lightest on the market.

The 1687's high performance begins with the tip of the demand lever. A large Teflon button completely covers it, reducing friction to an absolute minimum. Additionally, the button eliminates grooving and assures smooth and even inhalation throughout the life of the regulator. In older model regulators with metal-to-metal contact style levers and buttons, your breathing action would form a groove in the button. After repair, if the diaphragm is not replaced in its original configuration, the action of the lever passing over this groove sometimes causes a shuddering.

Plastic technology has also been applied to the exhaust diaphragm valve. Experts tell us that it takes more effort to exhale underwater than it does to inhale. To achieve meaningful performance, attention must be paid to both ends of the breathing cycle. The demand diaphragm

is a sealed unit, but the exhaust diaphragm is open half the time (sometimes more in poor performing regulators). This poses special problems in design and many exhaust valves have been made of relatively stiff silicone to assure that they stay shut. This reduces water leakage but increases exhaust resistance.

The Scubamaster 1687 has come up with an ingenious solution to this problem. Its exhaust valve is thin and light and exhales easily in normal dive positions. For the working diver, who spends much time in a head-down position, this could lead to a flow-through problem. To counter this, the 1687 has a weight (less than a gram) called an Exhaust Balancer that gently rests against the exhaust valve — preventing leaks with no noticeable increase in exhalation resistance.

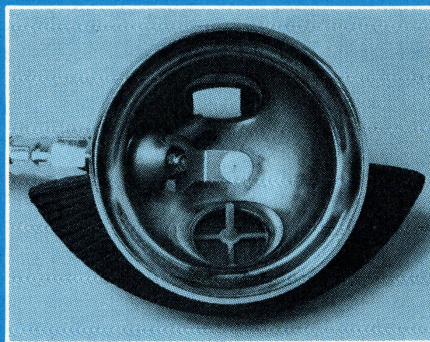
Ease of inhalation is achieved using aerodynamic principles, higher pressures and new valve seat materials. Nothing fancy, but an interesting experiment in refinement puts performance into the Scubamaster 1687. The brass case is brazed on the *outside* to make the inside as smooth as possible and reduce turbulence during inhalation. Most regulators use a venturi effect to direct air from an orifice to the diver's mouth. The 1687 has an aspirator tube that directs 60 percent of the air into the mouthpiece tube, creating a small vortex. The other 40 percent swirls around the case creating a slight negative pressure and helping to hold the diaphragm inward.

Since the intermediate pressure in the 1687 is factory set at around 147 psi

(about 15 to 20 psi higher than most other regulators) there is a considerable amount of air coming into the second stage. To accommodate the higher intermediate pressure, Scubamaster uses a new compound of hard silicone that won't score like other demand valve seats. This keeps the spring tension down and therefore a lower breaking effort is needed to initiate the breathing cycle. The new compound also reduces the maintenance needs of the second stage. Most adjustments after service are done in the first stage.

The first stage of the 1687 is a proven design — you've seen it elsewhere. It has three low pressure ports to accommodate the growing line of accessories that can be added to extend your diving fun. The higher intermediate pressure should not affect the performance of these accessories. Internal parts are fully encapsulated to reduce wear from the harsh marine environment.

We tested the 1687 under a variety of situations and with divers of all skills. It delivers lots of air, but not unmanageably. At about \$165 in most dive stores, the Scubamaster 1687 is a bargain. But don't expect it to perform like a lower performance model. You are buying high performance, perhaps more than you expect. Take the time to get used to it. >



The Scubamaster second stage case is pleasing to look at as well as being highly functional. The diaphragm cover is a single piece of molded neoprene held in place by a snap ring (above right). The Teflon button on the demand lever (above) is the key to the Model 1687's high performance.



photography by Geri Murphy



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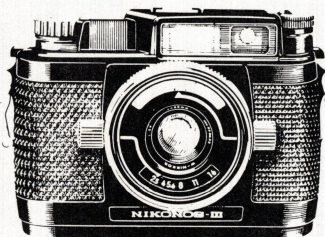
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MEDIFACTS

(Continued from Page 30)

THICK LUNGS

John Parker of Groton, CT. says his chest X-ray shows a calcification in the hilum of the lung (where the bronchial tubes and blood vessels enter) that measures 70.7 centimeters in diameter. Would this bar his acceptance in a basic scuba course?

Answer: Such a calcification you couldn't live with. It would be well over two feet thick — no room for lungs. Re-check the figures. Large calcified scars can certainly be dangerous. At least, they've been blamed for proven lung tear with air embolism. Small calcifications are common, especially in older divers, and no correlation with embolism has been established. When there's any doubt, a physician trained in diving medicine should be consulted.

DEEP SAT DIVING

Our species is ever drawn to new frontiers. Among others, medical student Robert Weinacker of the University of Alabama wants information about deep saturation diving.

Answer: If you can find a set of SKIN DIVER that goes back to 1969, the June issue has a review of saturation diving, and the July issue an account of 16 days at 1000 feet.

Today, working dives are being conducted at depths beyond 1000 feet, and humans have gone to 2000 feet in a compression chamber. Recently built test facilities have much greater capability. The giant chamber in Toronto, is rated for over one mile simulated ocean depth.

Deep saturation diving involves a host of problems foreign to sport diving. You'll find information in the U.S. Navy Diving Manual. Training is available through the various commercial diving schools advertised monthly in SDM.

NY FLEA MARKET

The Submersibles Diving Club of Southampton College will sponsor its fourth annual Diver's Flea Market on Sunday, October 7, 1979. The event will take place from 10 am to 5 pm in the college gymnasium at Southampton College, in Southampton, New York.

New and used sport and commercial diving equipment will be for sale or trade. Exhibits of diving antiques and artifacts, underwater photography gear, and underwater vehicles will also be on display.

Dive shops, clubs and individuals wishing to reserve selling space, or requiring more information should contact: Jett Nollner, Box 463S, Southampton College, Southampton, NY 11968. Or call (516) 283-4000, ext. 140.

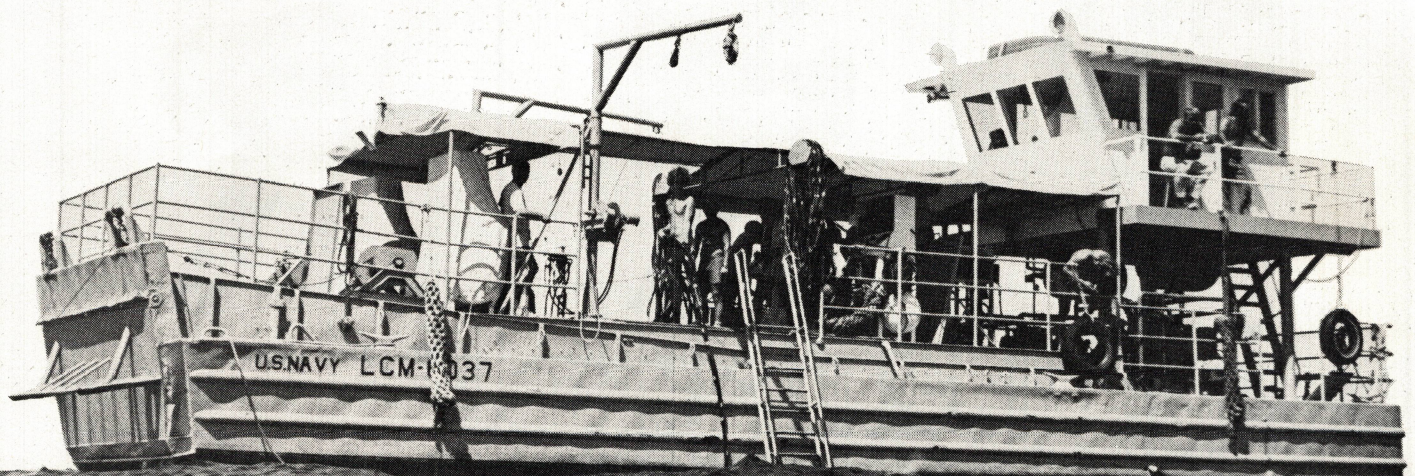
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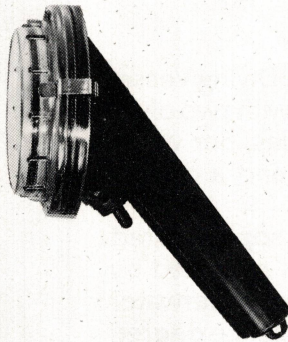
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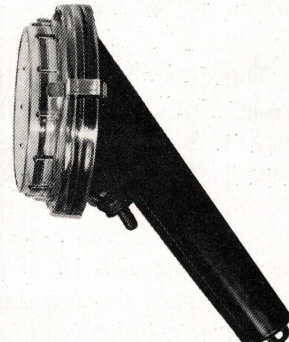
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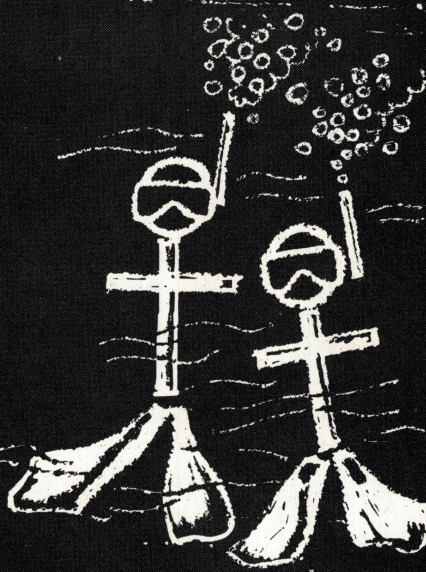
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SDM SCUBA QUIZ



Category: Women in Diving

By Dennis Graver

Not many years ago few women participated in diving. Currently, however, females number around 30 percent of those learning to dive and this is increasing. Various aspects of women in diving need to be understood by instructors, the women who dive, and by those who dive with women. Test your knowledge of women in diving by answering the following questions. Answers are on the next page.

1. Modern dive equipment for women:

- ☐ A. Is the same gear used by men
- ☐ B. Is being designed specifically for women
- ☐ C. Is produced by only two major manufacturers
- ☐ D. Is available on an extremely limited basis

2. Which of the following statements about the body temperature of divers is true? Women tend to:

- ☐ A. Get chilled more quickly than men and overheated less quickly
- ☐ B. Get chilled less quickly than men and overheated more quickly
- ☐ C. Get chilled more quickly than men and overheated more quickly
- ☐ D. Get chilled less quickly than men and overheated less quickly

3. Women divers who use "the pill" for birth control should:

- ☐ A. Know that pressure renders the medication ineffective
- ☐ B. Have no concerns about diving while taking the pill
- ☐ C. Refrain from diving until use of the medication has been discontinued
- ☐ D. Modify diving procedures to accommodate possible effects of the medication

4. During menstruation, a woman:

- ☐ A. Should refrain from diving until after the period
- ☐ B. May dive unless adversely affected by menses
- ☐ C. May dive, but must use external protection
- ☐ D. Should be alert for cramps while diving

5. Which of the following statements concerning menstruation and diving is false?

- ☐ A. Sharks are likely to be attracted by the blood in the water
- ☐ B. Flow is generally decreased by the reduced body temperature
- ☐ C. Protective devices are available which can prevent discharge
- ☐ D. Retention of body fluids is increased.

6. The current recommendation regarding diving during pregnancy is to:

- ☐ A. Restrict diving to depths of 60 feet or less
- ☐ B. Refrain from diving until after pregnancy
- ☐ C. Continue regular no-decompression diving activities
- ☐ D. Dive only during the first five months of pregnancy

7. A woman's susceptibility to decompression sickness is:

- ☐ A. The same as that of a man's
- ☐ B. Less than that of a man's
- ☐ C. Greater than that of a man's
- ☐ D. Unimportant

8. Select the true statement regarding the air consumption of women divers:

- ☐ A. It tends to be less than a man's
- ☐ B. It tends to be more than a man's
- ☐ C. It tends to be the same as a man's
- ☐ D. It has no general trend compared to a man's

9. Women tend to be safe and proficient divers:

- ☐ A. Except aboard a vessel, where they are bad luck
- ☐ B. Because they know their limitations and dive within them
- ☐ C. Because their diving skills are highly developed
- ☐ D. Because they dive an average of twice a month

SDM SCUBA QUIZ



Answers: Women in Diving

1. B. Is being designed specifically for women. Feminine gear needs to be generally smaller and shorter. The need for special wetsuits is obvious, but narrower masks are frequently necessary and smaller buoyancy control devices are needed as well. For some women, even smaller mouthpieces are required. In recent years, many manufacturers have been meeting the needs of women divers.

2. C. Get chilled more quickly than men and overheated more quickly. It is a popular belief that since women have more body fat than men they are better equipped for cold. Quite often, however, the ratio of body surface area to body mass is high, resulting in a rapid cooling rate. Females have fewer functional sweat glands than men and do not begin perspiring until body temperature rises two to three degrees higher than a male's.

3. D. Modify diving procedures to accommodate possible effects of the medication. A female scuba diver must be aware of possible increased susceptibility to decompression sickness when birth control pills are used. Conservative dive profiles are recommended, well within no decompression limits. A "safety stop" at 10 feet for a few minutes at the end of a dive is also a good idea.

4. B. May dive unless adversely affected by menses. Women who suffer headaches, nausea, and cramps during menstruation should refrain from diving, just as anyone not feeling well should postpone diving. Women who have no adverse effects throughout menstrual flow can participate in sports, diving included.

5. A. Sharks are likely to be attracted by the blood in the water. This is false. The average blood loss during menstruation is quite small and spread over three or four days. There is no evidence of increased shark interest in menstruating females and it has been theorized that sharks are not attracted to menstrual blood.

6. B. Refrain from diving until after pregnancy. Studies at Texas A & M University have lead to this recommendation. Complications due to increased oxygen partial pressure and nitrogen bubble formation are possible. Although not verified in humans, these potential hazards require a conservative policy pending further research. Not all authorities are in agreement regarding the matter, however. Several notable diving physicians currently approve of a 30 foot depth limit for pregnant divers.

7. C. Greater than that of a man's. Studies by Bruce Bassett, PhD of the USAF School of Aerospace Medicine and surveys by Susan Bangasser, PhD, have shown women may have a significantly greater incidence of decompression sickness than males exposed to the same pressure changes. However, it is important to note that the incidence rate for both women and men is quite low. Avoidance of decompression, deep dives, and flying shortly after diving are recommended for all divers.

8. A. It tends to be less than a man's. Women are generally smaller than men, while men are frequently more physically active as divers. The overall result is more air used by males. My wife uses a 50 cubic foot tank and I use a 71.2 cubic foot tank; our bottom times are about equal on dives.

9. B. Because they know their limitations and dive within them. Women have a commendable, cautious attitude toward diving. They generally know what they are capable of doing and will not be goaded into doing something for which they lack ability or confidence. Females are thinking divers, not relying on physical strength to "bull" their way through situations. Women can be outstanding divers.

Physiological studies of women in diving are far from conclusive at this time and research continues. Until guidelines are established based on accurate data, a conservative approach to the sport is recommended for women divers. Women who follow recommended procedures can make excellent divers. Keep up to date on the latest developments by reading various dive publications, including SKIN DIVER.

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A lot of divers will be delighted to learn that there is an easily accessible area off Florida where jewfish are still so abundant and so tame that schools of 15 to 20 of these behemoths will often follow you around the bottom. These giant sea bass are so curious about humans they sometimes swim up to greet you as you descend from the surface. You can play with a 500 pound fish named Milton who will let you feed him hot dogs and, if you have the right kind of fish-appeal, he might let you pet him. These fish are so thick around the reefs and wrecks in the area that local divers call it "Jewfish Country."

The area is located in the southern Gulf of Mexico just north of Everglades National Park and about 15 to 20 miles offshore from the cities of Fort Myers and Naples. And this location is why the giant bass are still around. Jewfish Country is on the opposite side of the state from Gold Coast cities and it has not been promoted as a dive resort. If it had, the huge bass would probably be as hard to find off Fort Myers and Naples as they are in more popular dive spots.

Jewfish were once so numerous in the Atlantic off South Florida that old-time divers tell of seeing huge schools roaming the bottom like herds of cattle. They were so common in the keys that divers ran into them almost every time they went in the water. Today, however, the big fish have virtually vanished from these areas. A major contributing factor to their disappearance is water pollution and the disruption of marine ecosystems which reduced food supplies. Equally important is the constant pressure from spearfishermen. The introduction of powerheads made it so easy to kill these giant fish that commercial divers slaughtered them by the hundreds. This doesn't mean they killed off all the jewfish. Rod and reel fishermen landed a lot more than the divers and still do. The giant fish probably just became gun-shy and so afraid of divers they abandoned the shallow reefs for safer waters. Whatever the reason, these leviathans are now so rare in Florida's popular underwater playgrounds that divers rarely see one.

State law now prohibits the use of powerheads for taking food-fish in Florida. And, although the law does not apply to federal waters (three miles offshore in the Atlantic and three marine leagues, about nine miles, in the Gulf), just having a speared fish in your possession is evidence of a violation and the marine patrol can nail you when you bring it ashore. You can't evade the law by cutting off the heads of powerhead-blasted fish because possession of a headless grouper or jewfish is *prima facie* evidence that it was taken illegally. This section of the law is

somewhat ambiguous because it says, "taken for commercial use," but you might have a difficult time convincing the marine patrol or a judge that you have no intention of selling a decapitated fish that weighs several hundred pounds. The meat is so low-grade and grainy that one expert spearfisherman said, "Who in the world would want a freezer filled with 400 pounds of tough jewfish meat when there are plenty of good-tasting fish around?"

Most competent spearfishermen respect the law because they know that killing a giant bass with a powerhead requires no more skill than killing a cow with a shotgun or a high-powered rifle. The macho diver who expects to become a hero by hauling one ashore is more apt to be greeted by ridicule than admiration.

This is particularly true in Naples because the city is in one of the most conservation-minded counties in Florida. A special state law prohibits spearing any species of fish in Collier County. The best diving is in federal waters 15 to 20 miles offshore where spearfishing is permitted and local divers do spear fish for food. But they don't

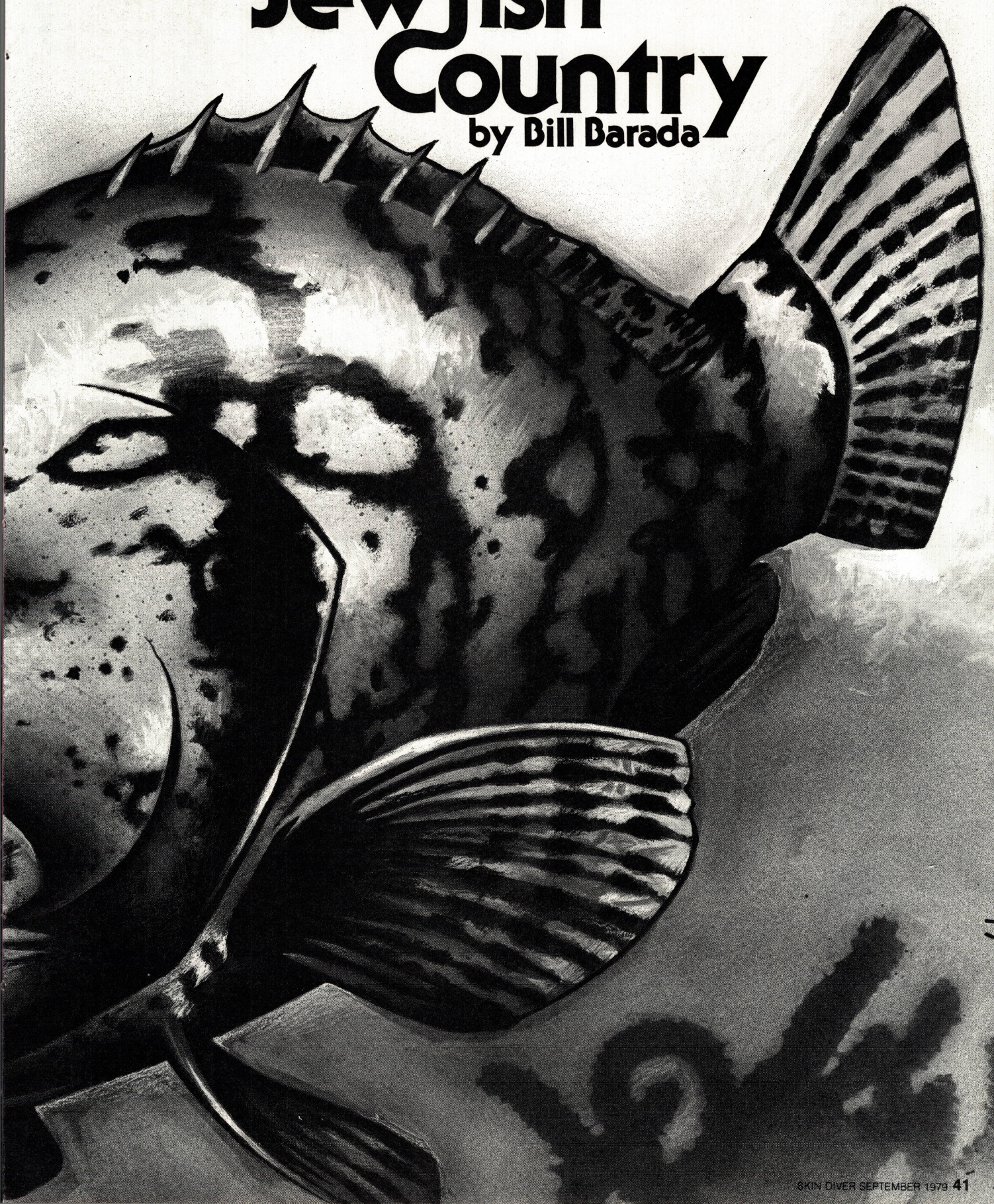
shoot jewfish because they consider them something special. That's why you can see these titans on virtually every reef and wreck. And the fish are as fascinated by divers as divers are by the fish.

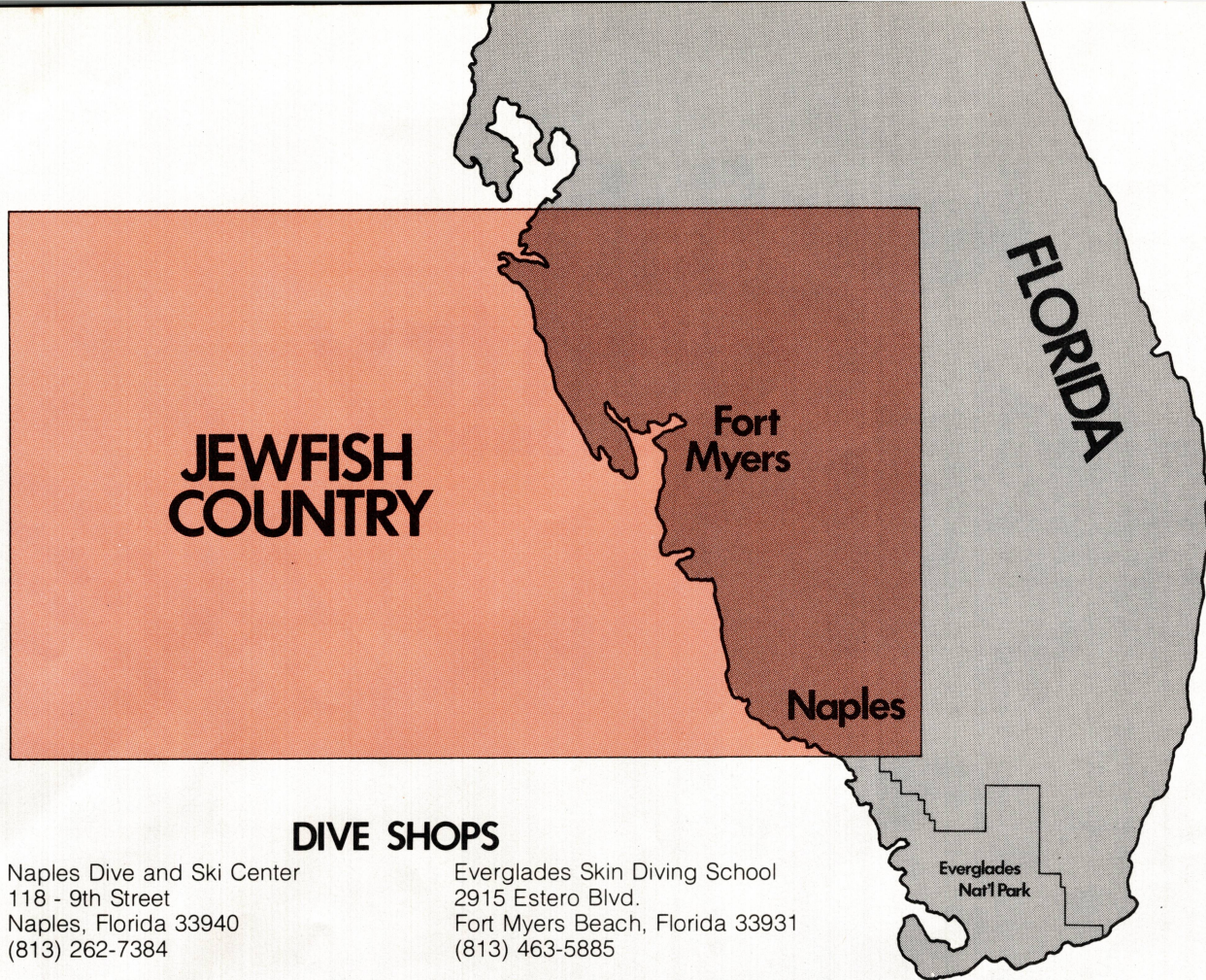
Steve Lucas, a professional underwater photographer who has spent a lot of time on the reefs and wrecks of Jewfish Country, claims it is not uncommon to see as many as 20 within your range of vision. He says they usually keep moving in and out around you, but if you sit quietly for awhile they will move in close to look you over. Bob Baldi, owner of Everglades Skin Diving School in Fort Myers, says the same thing. "If you want to get close," says Bob, "just sit still for



Jewfish Country

by Bill Barada





awhile and they will come to you."

The big fish are unpredictable, however, and local divers warn their strange actions can sometimes be unnerving. Steve tells of one incident when he looked up from his camera gear and found himself completely surrounded by the giant bass. They were facing him head-on, watching him intently, and all he could see was a ring of massive heads no more than six feet away. Steve says, "It was an eerie feeling. There were over a dozen of them ranging from 100 pound babies to 800 pound giants and some of their mouths looked big enough to swallow me and all of my gear with room to spare. It didn't help that they were making thumping noises that sounded threatening."

When jewfish or grouper are disturbed they make an explosive, booming sound by popping their gills. But the sound may also be a warning to other fish because, after a colony has been scattered, you can hear them thumping in the distance when the fish are out of sight.

The titans circling Steve proved to be as nervous about him as he was about them. He kicked off the bottom and the fish vanished in such a flurry they left a

cloud of turbulent, sandy water behind.

Diving conditions in Jewfish Country are much the same as in other parts of the Gulf. The bottom is so flat that the water is only 30 feet deep nine miles offshore and the reefs are rocky ledges that are remnants of ancient shorelines. The good diving begins at depths of around 40 feet about 20 miles out where visibility ranges all the way from 15 to 50 feet during the summer. Larger ledges and clearer water are found farther offshore and visibility reaches 100 feet on some of the deep-water ledges and wrecks that are 30 miles out.

The best diving, as in all Florida waters, is in the summer when the winds calm down and the water warms up. But diving 20 to 30 miles offshore is always a gamble. You are exposed to the open sea which can get rough if the wind picks up. That is why local dive shops do not run open boats, and all reservations are made subject to prevailing conditions.

Spearfishing is excellent throughout the area and so is hunting for conch, crabs and seashells for those who are interested. But lobsters are scarce because the jewfish probably keep them thinned out. The big bass love

crustaceans and can capture a lobster even when it is hiding under a ledge.

Sea bass literally "inhale" their food by opening their mouths and creating a vacuum. The cavernous mouth of a big jewfish creates a suction so powerful these fish can inhale a huge sea turtle or a big fish from a surprising distance away. To catch unwary lobsters, crabs and smaller fish that are hiding under a ledge, the fish simply places its mouth next to the entrance and inhales everything within range that is not wedged-in, buried or tied down. When secure hiding places are scarce, as in Jewfish Country, so are the bugs. Stone crabs are abundant, however, because they protect themselves by burying in the sand.

The voracious appetite of giant bass has caused some exciting incidents for Naples divers because the fish will sometimes try to steal a spearfisherman's catch. Veteran divers Russ Stahlman and Pete Havron tell of such an experience on the 78 foot ledge. Looking down from the surface they saw a bottom so alive with fish they couldn't see the rocks. As they descended, a large colony of jewfish began concentrating beneath them. Then six of the behemoths left the bottom

and swam up through the water toward them. Pete says, "It was one of the most exciting things I've ever seen. They looked like monsters as they came in close to look us over. They were only a few feet away and they stayed with us circling, all the way to the bottom. They acted like a greeting committee welcoming us to the new reef."

The colony of jewfish scattered after the divers hit bottom, but later, after Russ had three fish in his goody bag, Pete noticed that the crowd of giant bass was trailing behind him. He stopped to watch and says, "They were so intent on following Russ, they didn't pay any attention to me. The whole colony, about 30 or 40 of them, swam by me as if I didn't exist. Some were so big the swish of their

over the head with my speargun. This must have surprised him because the bag came loose and I got my fish back."

Fish-stealing is a common hazard in Jewfish Country. Steve made the mistake of letting his diving buddy, Susan Carroll, hold a speared snapper while he went after a few pictures near the ledge. But when he turned around Susan was gone. Steve made a quick search of the ledge without finding her, then surfaced to look for bubbles. When he spotted Susan she was flipping at full speed toward the boat. After she had calmed down, Steve learned that her fright had been caused by a determined jewfish which had made repeated passes at her until it finally managed to steal the snapper she was holding. Susan is still convinced it was a

petting. The fish slowly calmed down and, according to Steve, began to enjoy the treatment. After a while Vicki eased off the wreck and continued her petting as she slipped down beside the fish. Steve says, "The monster was completely mesmerized by Vicki's attention. It let her put her arms around it, then she finally got on its back and sat astride it. I guess her stroking and petting made it fall in love with her because we saw the water turn white with its milt. And that's why we called him Milton."

Nobody really knows how big a jewfish can get. The largest ever landed weighed around 800 pounds, but Steve has a picture of a nine foot long leviathan that scientists estimate would weigh around 1000 pounds. The picture was taken on the wreck of the *Bayronta*, a freighter that was broken in half by a 1918 hurricane. The stern half lies upside down in 100 feet of water about 30 miles offshore and, according to local divers, the water is often so clear you can see the ship from the surface.

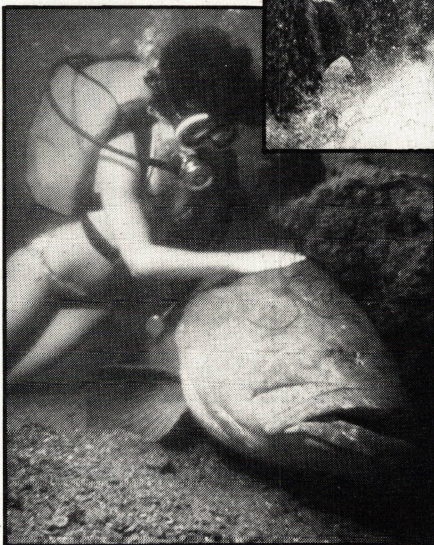
Steve snapped a series of pictures of the gigantic fish drifting next to the ship's propeller and when they were developed he noticed that its body was as long as the huge blade. He later measured the length of the propeller blade as nine feet, so he knows the fish was at least nine feet long.

The *Bayronta* is visited by divers from both Naples and Fort Myers who claim that even larger jewfish can be found inside the hull. The interior is like a tremendous barn full of twisted girders and the light is so dim inside that only moving shadows can be seen. Most of these shadows are giant sea bass.

Although local divers do not spear giant sea bass, other divers do, and locals say they can always tell when the jewfish hunters have hit a ledge or a wreck because the big fish disappear for weeks. Russ and Pete have proof that this happened on one of their favorite ledges. They told another diver where it was and he phoned to thank them because the three jewfish he speared brought a good price. The next time they hit the ledge the titans had disappeared.

But this has not happened often enough to spoil the fun and divers who are interested can still play with these monsters in Jewfish Country. Motel reservations are not needed during the summer because, unlike the keys, this area is not a summer resort. After the winter tourists leave, vacancies occur and prices drop. But you will need to make dive trip arrangements and reservations in advance because only two shops are now running trips to Jewfish Country. The Naples shop only runs trips on special charter. The Fort Myers shop runs one each week.

Milton, a 500 pound jewfish, is a favorite of divers in Jewfish Country. The big fish is so tame, it will let divers feed it hot dogs and it follows them around underwater. But Milton will only let one diver, Vicki Chaitman, (below) actually touch him.



legitimate attack.

Steve's favorite pet is a 500 pound fish named Milton. The big fish is so tame it lets divers feed it hot dogs and is so friendly it follows them around the bottom. But Milton will not permit anyone to touch him except Vicki Chaitman, the girl who originally captured the big fish's affection and gave him his name. It is a fascinating story that Steve managed to capture on film.

The episode began when Vicki spotted the jewfish resting beneath a piece of a wreck. Steve says she is very competent in the water and so fearless she is sometimes brash. He watched with interest as she slowly swam into position immediately above the big fish, then carefully eased herself close enough to reach down and touch it. The bass warned her with thumping sounds, but didn't move. Vicki cautiously reached down and slowly began stroking the fish's back. The thumping increased in volume, but the jewfish still didn't move and Vicki patiently continued her stroking and

tails tumbled me backward."

Russ didn't see the jewfish, but he felt one of them grab his fish bag. He says, "I had two 15 pound grouper and a 10 pound snapper inside that bag and all I could see was the wire handles sticking out the fish's mouth. I grabbed the handles and we had a tug-of-war. I even braced my foot against its head and yanked. But it didn't do any good. Then I got mad and started beating the big devil

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IQ-11 POSTER SESSIONS

The well received poster sessions — small group exchanges on hot topics — held at last year's IQ-10 will be repeated this year at NAUI's IQ-11 in Houston. The informal, off-the-record discussions are designed to increase communication between speakers and persons attending the conference.

For information on poster sessions or to register for IQ-11, contact Jeanne Bear Sleeper, Conference Director, NAUI Headquarters, P.O. Box 630, Colton, California 92324.

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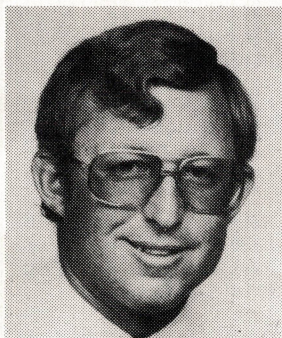
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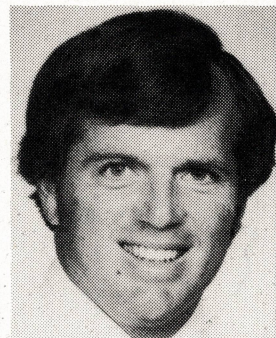


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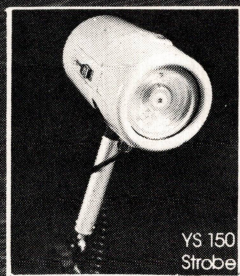
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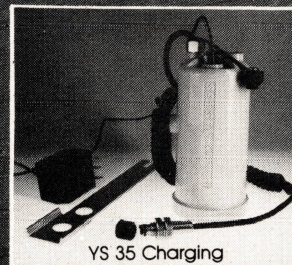
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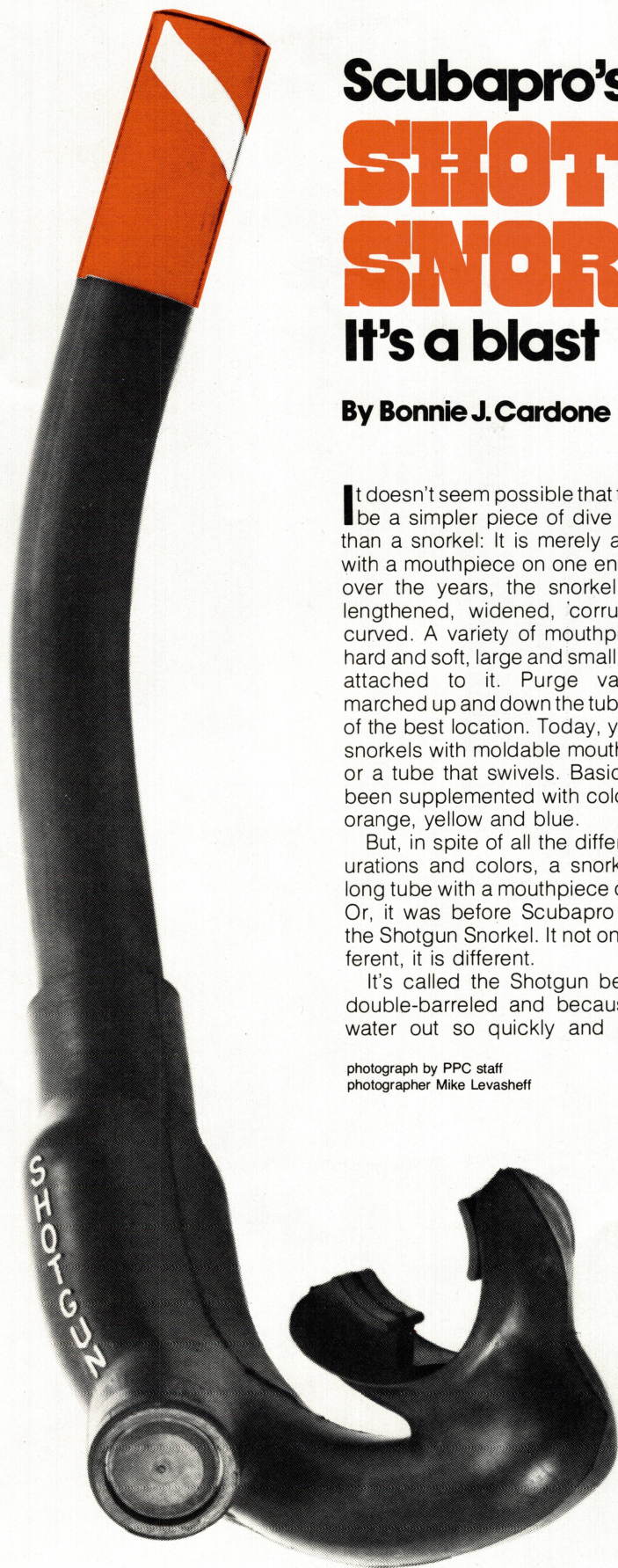
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Scubapro's **SHOTGUN SNORKEL** It's a blast

By Bonnie J. Cardone

It doesn't seem possible that there could be a simpler piece of dive equipment than a snorkel: It is merely a long tube with a mouthpiece on one end. And yet, over the years, the snorkel has been lengthened, widened, corrugated and curved. A variety of mouthpieces, both hard and soft, large and small, have been attached to it. Purge valves have marched up and down the tube, in search of the best location. Today, you can buy snorkels with moldable mouthpiece lugs or a tube that swivels. Basic black has been supplemented with colors such as orange, yellow and blue.

But, in spite of all the different configurations and colors, a snorkel is still a long tube with a mouthpiece on one end. Or, it was before Scubapro introduced the Shotgun Snorkel. It not only looks different, it is different.

It's called the Shotgun because it is double-barreled and because it blasts water out so quickly and easily. The

photograph by PPC staff
photographer Mike Levasheff

brainchild of a man named Joe Schuch, the Shotgun Snorkel underwent nine months of evaluation at Scubapro. It was studied and modified during this time. Approximately two dozen different designs were tried and discarded before the final version was decided upon.

To understand how the Shotgun differs from conventional snorkels, let's take a look at what happens when you clear both types.

With a conventional snorkel, you may begin to exhale through the mouthpiece as you near the surface of the water; or you may exhale sharply when you reach the surface. In both cases, air pressure from your lungs is used to push water out of the top of the snorkel so you can breathe through it.

With the Shotgun, water starts to drain out of the purge valve as soon as the snorkel tip breaks the surface of the water. The user exhales, simultaneously forcing what water remains in the primary tube out the top of the snorkel and completely clearing the secondary tube. It takes only a gentle puff because the snorkel contains only half as much water as conventional snorkels: Gravity has already done half the work for you.

No matter how experienced you are in using a snorkel, you will be amazed at the ease with which the Shotgun is cleared. One little puff does the job.

But Scubapro didn't just improve the design of the tube part of the snorkel, the company also improved the mouthpiece. Now fitted to the teeth, this new mouthpiece makes holding the snorkel in place easier. This is the same mouthpiece Scubapro is now using on the second stage of all their regulators, so you know it's got to be comfortable.

The Shotgun Snorkel is available in black, with an international orange tip, at your local Scubapro dealer. It sells for \$10.50. Try it: You'll buy it! ➤

The Friendly ALIEN

The octopus is a shy, sensitive creature that spends most of its life in seclusion. It is one of the most intelligent and docile animals that dwells in the sea. An invertebrate, it belongs to the phylum Mollusca, class Cephalopoda (a Greek word meaning "feet

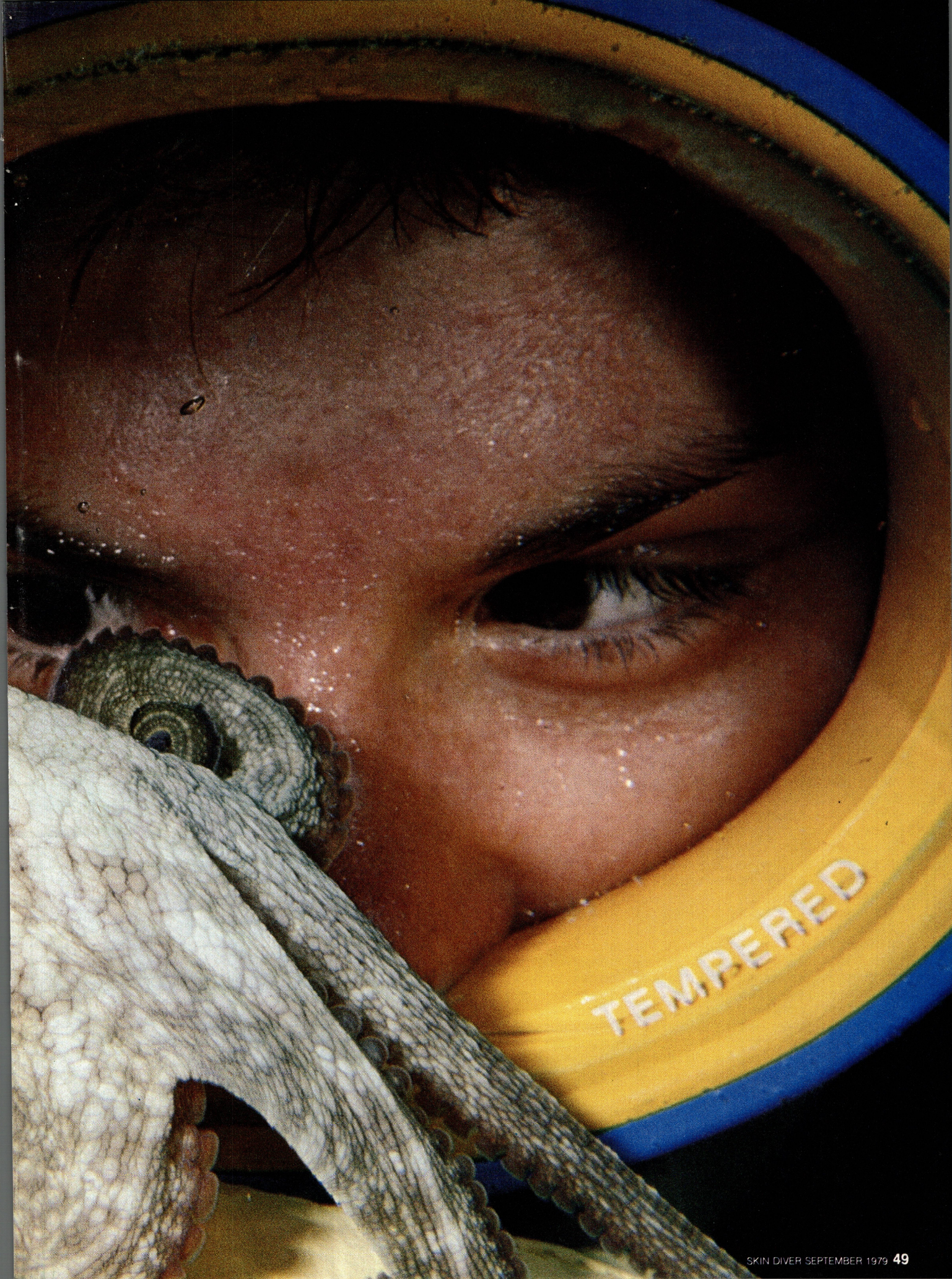
around the head"). Octo means eight and pus means foot. Found in all the oceans of the world, octopuses range from the shallow, warm coastal waters of the tropics to the deep, cold seas of the Antarctic. Some species manage to live in water over one mile deep.

There are over 150 known species. They range in size from dwarfs a few inches long to giants with an arm span of up to 32 feet. The species seen by most divers, however, is the common reef octopus which is 6 to 18 inches long. Octopus eyes are highly

The octopus is really shy, sensitive and seclusive

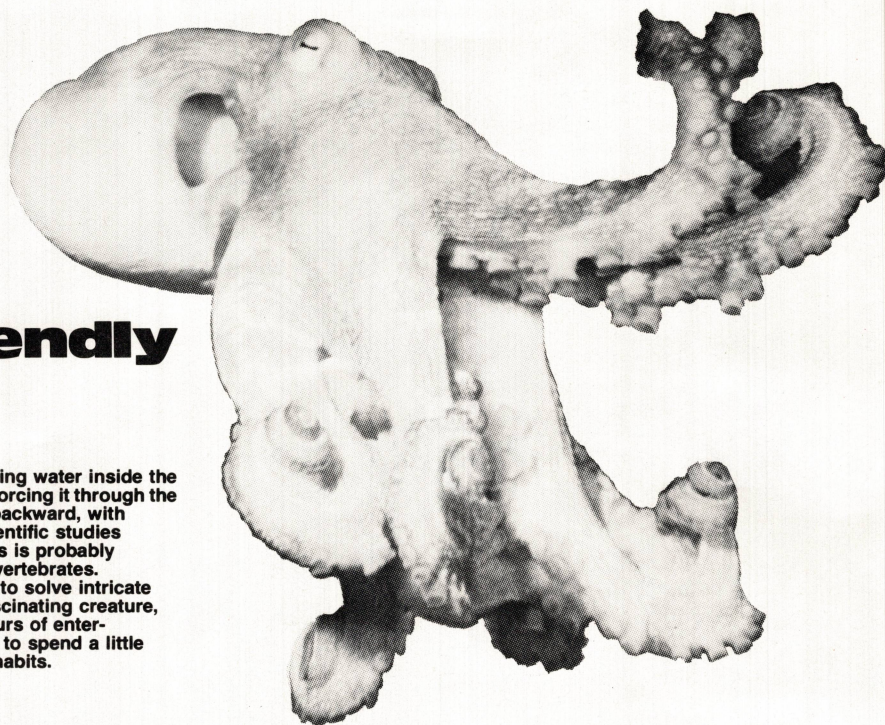
Text and Photography by Geri Murphy





The Friendly ALIEN

The octopus swims by drawing water inside the mantle cavity and suddenly forcing it through the siphon. The animal travels backward, with its arms trailing behind. Scientific studies have shown that the octopus is probably the most intelligent of all invertebrates. It learns quickly and is able to solve intricate problems. A friendly and fascinating creature, the octopus can provide hours of entertainment to the diver willing to spend a little time observing its unusual habits.



developed and similar to those of humans. The pupil is a black rectangular bar across the center which tends to remain on a horizontal plane regardless of body position. Unique muscle control allows the creature to raise its eyes high off the head, allowing it to peek out of its den without exposing the rest of its body. Like little periscopes, the omnidirectional eyes follow the movements of the outside environment while the animal remains totally motionless and protected.

Below the eyes and forward of them is a tube called the siphon. This siphon protrudes from a slit in the mantle, an envelope of skin covering the body. Water is drawn in from under the mantle cavity where it passes over the gills for extracting oxygen. The water is then discharged through the siphon. The soft, oblong sac above the eyes (often mistakenly called the head) contains the stomach and other internal organs.

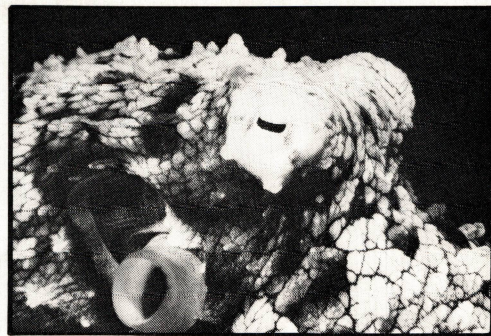
Located on the underside of the octopus and well concealed from view is the animal's beak. Curved like a parrot's, the beak is extremely sharp and is used for eating crabs, lobsters and other shellfish.

Surrounding the beak and mouth cavity are eight supple arms that taper to a slender tip. They are joined at the base of the body by a thin, webbed membrane. The underside of each arm is lined with a double or single row of closely spaced muscular disks that act as suction cups. These suckers are graduated in size with those close to the mouth fairly small. Gradually increasing in diameter to about the middle of the arm, the disks then become smaller and smaller until they are quite tiny at the tip of the arm. To create suction, the octopus places the cup in

contact with a surface. It then draws up the center part of the cup so that there is a vacuum inside. The difference in pressure between the water outside and the airless space inside holds the cup firmly to the surface. The common octopus has 240 disks on each arm, giving the animal a total of 1920. This results in a tremendous amount of gripping power. Experiments have shown that a pulling force of 40 pounds must be exerted to release the grip of a small (3 pound) octopus. Any diver who has held an octopus underwater knows the strange sensation created by these little suction cups as the animal moves along a surface.

The octopus' soft, shell-less body is quite vulnerable to attack from predators such as eels and groupers, but it does have several lines of defense. Primarily, the octopus maintains a low profile by living a solitary and secluded life inside small coral crevices, caves or under rocks. Small species often find shelter inside discarded tin cans, tires, bottles and other debris. Safe and secure in its den, the octopus will usually avoid exposure during the daylight hours, preferring to hunt for food at night.

Another defense mechanism utilized by octopuses is one similar to that of the chameleon: The animal changes color to blend in with its background. Practically invisible, it avoids detection by remaining motionless. If discovered and subsequently frightened, the octopus will change form and color within seconds. At first it may turn pale with fear, but then it may swell in size and turn deep red or dark brown in an attempt to intimidate its enemy. The eyes as well as the body and arms can change color according to its



"mood." When extremely agitated, the skin may become rigid with little horns rising up like bumps or warts. If none of these defense tactics prove to be effective, the octopus will finally resort to flight.

The octopus swims by drawing water inside the mantle cavity and suddenly forcing it through the siphon. The amount of force exerted by the muscular walls and the frequency of pulsations determine the speed and distance the animal will travel. Because the siphon is stationary, the octopus must travel backward with its arms trailing behind. If the octopus determines it is in serious danger, it may discharge a cloud of sepia, a dark, inky secretion. Ejected through the siphon, the ink serves to distract the pursuer while the octopus attempts escape. At the same time the ink is released, the octopus changes colors to further confuse the assailant. Taking advantage of the distraction, the octopus will settle to the bottom a few feet away and immediately change color again to blend in with the surroundings.

Octopuses breed at different times of

the year depending upon the species. The female receives spermatophores from a special arm of the male which fertilizes the eggs. After an interval of time which may range from three to eight weeks, the female deposits the eggs in a secluded cave or crevice. The eggs are attached to the ceiling of the cave on long white stalks forming clusters of different sizes. The mother octopus cleans and aerates the eggs by shooting jets of water from her siphon over them. She assiduously guards the eggs from predators and will not even leave them for food. Approximately 50 days later, or longer depending on the species, the eggs hatch. Anywhere from 50,000 to 200,000 eggs may be laid, but only a few will survive the first month after birth. The mother octopus dies shortly after the eggs hatch.

Except for the marine mammals, the octopus is endowed with an intelligence superior to that of any other sea creature. The octopus brain is capable of receiving and registering information and has excellent memory retention. Incredibly, the octopus has proven to be a creature that can evaluate a problem and intelligently determine a course of action to solve it.

A well documented example of octopus intelligence is described in the book, *Octopus and Squid*, by Jacques-Yves Cousteau: In summary, a live lobster was placed inside a glass jar and closed with a cork stopper. The jar containing the lobster was placed outside the home of an octopus who was familiar with divers. With some hesitation it came out of its little home and attempted to grab the lobster with one arm. Suddenly the octopus was faced with a problem never before encountered. There was an invisible wall between it and the lobster. Startled, puzzled and annoyed, the octopus rapidly changed color several times. The octopus then tried to envelope the lobster in its arms — as it would normally do with captured prey. Climbing completely onto the jar, the octopus found it could not

penetrate the invisible shield. Next, the octopus explored the surface of the glass jar more carefully. Moving its arms up the smooth glass, it discovered the rough surface of the cork stopper. Slowly moving across the cork the octopus found a small hole that had been drilled through it. Carefully extending the slender tip of an arm down through the tiny aperture, the octopus touched the lobster. Finally, realizing that the stopper could be dislodged, the octopus yanked it off the jar and was rewarded with dinner.

People often wonder if the octopus will use its beak to bite a diver. Reports of octopuses biting people are rare. A duct within the animal's mouth is used to secrete a toxin that kills prey and it is believed that the octopus uses its beak only for crushing the shells of crustaceans after they are dead. However, there is one small octopus that may inflict a wound to humans that is quite poisonous and sometimes fatal. The blue-ringed octopus of Australia is considered highly venomous. But there have been only three reported deaths in the last quarter century caused by this octopus.

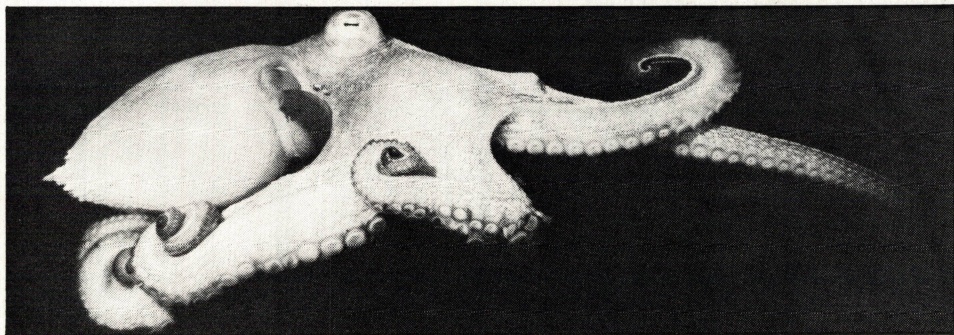
Finding an octopus is easier than one might suppose. Living on a diet of small crustaceans, the octopus will deposit the empty shells of lobsters, crabs and mussels outside its home. These telltale signs — shells and debris piled in a heap — will usually lead you right to the front door. It is interesting to note that the discarded shells of lobsters and crabs are often still intact although empty of meat. This is because the octopus only needs to break open the crustacean at the joining of the thorax and abdomen. The slender arm tips then penetrate throughout the shell removing the meat by passing it from sucker to sucker all the way to the mouth. The arms can thin and elongate to reach the tiniest crevice and will drain the entire cavity of flesh without breaking the shell into pieces. In fact, shell collectors have been known to take advantage of this unique octopus talent to get their shells cleaned. They simply leave the live shells outside an octopus den and return the next day. Sure enough, the shell is right where they left it — as clean as a whistle.

It is an established fact that the small Caribbean octopus is a shy and even friendly creature, but what about the larger species found off Seattle, Washington? Surprisingly, divers have found that the giant octopus is even more timid than its Caribbean cousin.

Far from being the aggressive monster so vividly depicted in literature and motion pictures, the octopus is a timid and benevolent animal. It poses no threat to divers who understand it. The octopus is in fact a friendly and fascinating creature and will provide hours of entertainment to those willing to spend a little time observing it in action. 



Found in all oceans of the world, the octopus spends most of its life in quiet seclusion. Since its soft body is vulnerable to attack by predators (such as eels, groupers and divers), it has several clever lines of defense. These include a chameleon-like quality of changing color to blend in with the surrounding environment.



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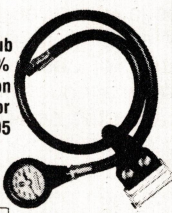
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SONOMA COUNTY RESCUE WORKSHOP

The fourth annual Sonoma County Diver Rescue Workshop will be held on October 27 and 28, 1979, at the junior college in Santa Rosa, California. The format will be a lecture session followed by pool demonstration and practice with a second day of work/fun.

Speakers include Lt. Cmdr. David Smith, USCG; Christopher Dueker, MD; Ted Finley, MD; and David Nagle, Sonoma County Deputy Sheriff and Rescue Educator. A panel discussion featuring Charles Brown, MD, Medical Consultant of SKIN DIVER Magazine and Takashi Hattori, MD, of the Pacific Grove Diver Rescue Unit, will complete the Saturday morning session.

After a picnic lunch, Warren Glaeser, co-developer of the Do-Si-Do method of resuscitation will conduct a pool session.

The Sonoma County Diver Rescue Workshop is a non profit all-volunteer organization, dedicated to the advancement of diver education and safety. This year the proceeds will go toward grants for diver safety and information programs and toward the standardization of rescue procedures.

The registration fee for the two day workshop, which includes lecture, lunch, water training, and an NAUI Specialty Diver card, is \$25. Persons not involved in the waterwork can attend the speaker seminar and lunch and will be welcome to observe the water training for \$15. All registration fees are non-refundable and tax deductible.

For further information and registration forms, send a self-addressed envelope with 30¢ postage before Oct. 13, 1979, to: Sonoma County Diver Rescue Workshop, P.O. Box 3967, Santa Rosa, CA 95402, Attention: Mel Cummings.

Staff training for the workshop will be held on September 15, 1979, at 10 am at the Santa Rosa Junior College swim center. Interested instructors and assistant instructors wishing to work on staff contact (before September 8, 1979): Rich Peters, 3504 Flintwood Dr., Santa Rosa, CA 95404. Or call (707) 527-5291.

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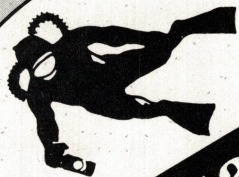
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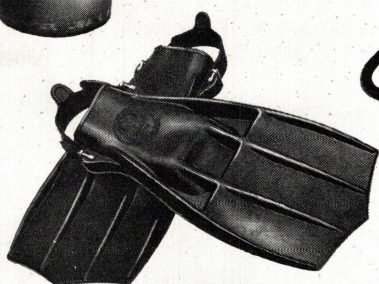
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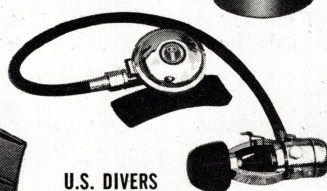
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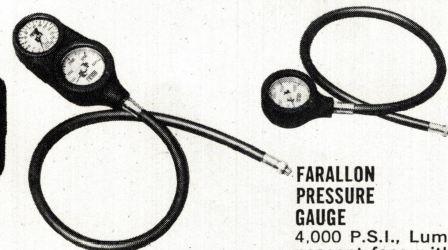
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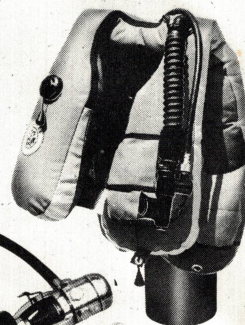
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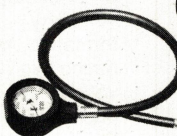
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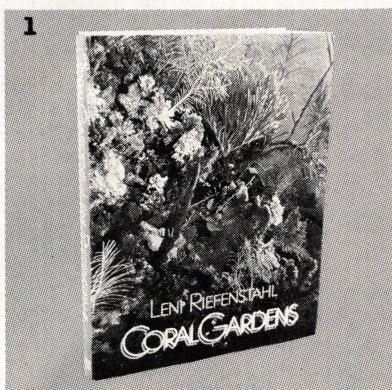


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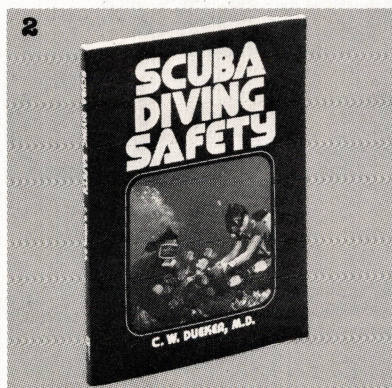
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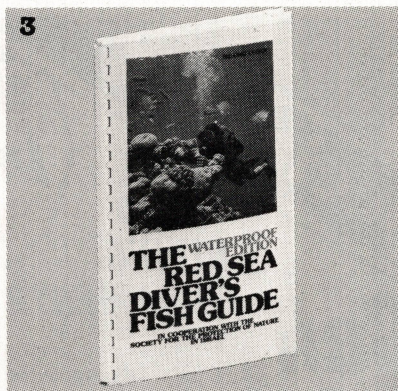
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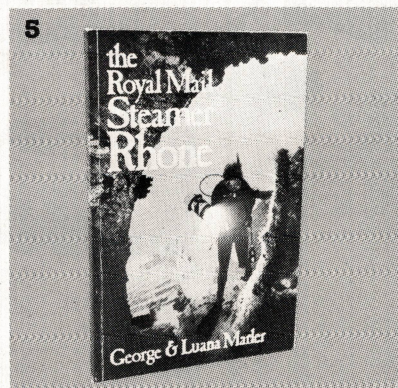
2 Scuba Diving Safety — A practical, clearly written text by U/W medicine expert, C. W. Dueker. Important reading for all sport and professional divers, it covers safe diving techniques, first aid, emergency ascents, rescue, etc. \$3.95. From World Publications, 1400 Stierlin Road, Mountain View, California 94043.



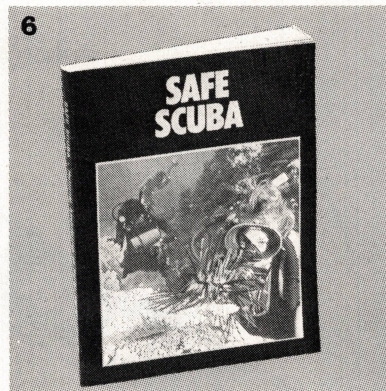
3 The Red Sea Diver's Fish Guide — A completely waterproof and durable U/W edition, specially designed for skin and scuba divers. It contains 80 pages of color photographs, diagrams, and information on the fish life of the Red Sea. \$9.95. From Seapen Books, 9200 Sunset Boulevard, Los Angeles, CA 90069.



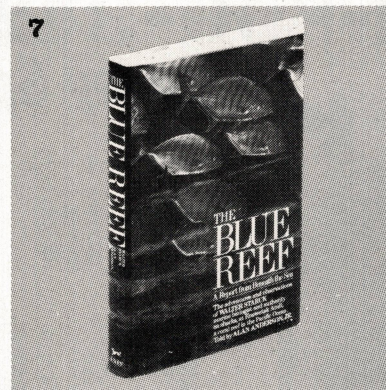
4 Encyclopedia of Practical Photography — Two great names in photo information, Amphoto and Kodak, have produced this vital photographer's tool. A 14 volume set, it is superbly illustrated and packed with useful diagrams and charts. \$159.95 plus freight. From Amphoto, 750 Zeckendorf Bl., Garden City, NY 11530.



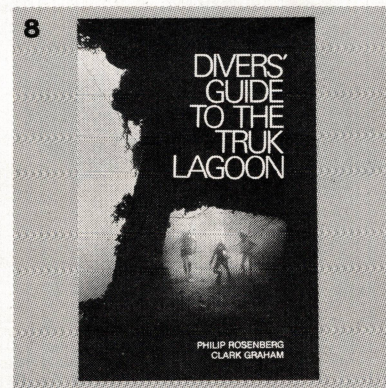
5 The Royal Mail Steamer Rhone — An U/W guide and brief history of the British Virgin Islands by professional photographer/divers George and Luana Marler. It includes beautiful photographs, maps and diagrams of the historic *Rhone* wreck. \$7.95. From Marler Publications, 3817 Piedmont Rd., Ft. Worth, TX 76116.



6 Safe Scuba — A colorfully illustrated student textbook supplemented with study guides, charts and dive tables. Simply written and easy to understand, it leads a beginning diver from the first U/W experience to more advanced open-water techniques. \$15. Available at your nearby NASDS dive store/school.



7 The Blue Reef — A guided tour into the breathtaking splendor surrounding a tropical Pacific coral reef. Marine biologist Walter Starck dived and photographed the U/W life around Eniwetok Atoll, recording his findings in this lively book. \$12.95. From Alfred Knopf, Inc., 201 E. 50th St., New York, NY 10022.



8 Divers' Guide to the Truk Lagoon — The first comprehensive study of the wrecks of Truk. The book contains a map with detailed information on the history and location of each WWII wreck, and beautiful color photos. \$5 plus \$1 postage. From Micronesia Aquatics, P.O. Box 57, Truk Lagoon, ECI 96942.

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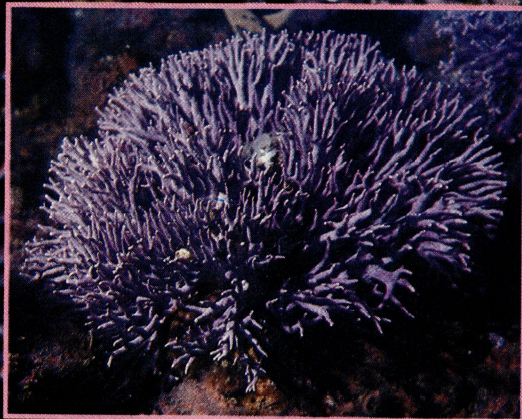
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CALIFORNIA HYDROCORAL



The West Coast of North America is not known for lush coral formations. Indeed, most West Coast coral in near-shore waters occurs as half-inch diameter calcium carbonate cups scattered over rocky surfaces.

However, in California and Baja there is one very peculiar organism that forms a unique cluster up to 24 inches in diameter. This is the red, pink, purple, or blue hydrocoral, *Allopora californica*

IS IT ON THE BRINK OF EXTINCTION?

BY MARK GIBSON

(also known as *Allopora porphyra*). Not a true coral, this delicate colonial animal belongs to the coelenterate group Hydrozoa, whose more typical members include a variety of jellyfish and the deadly Portuguese Man-O-War.

How a member of the Hydrozoa managed to take off in this peculiar evolutionary direction is not at all understood by marine scientists, but if you place *A. californica* next to a true coral (from the Anthozoa group), you would be hard pressed to tell them apart. While there are at least 25 species of *Allopora* around the Pacific Ocean, *A. californica* is the only erect-colony species of the four that occur in patches from San Francisco to Baja. Because the other three species form thin encrustations on rocks, they are difficult to distinguish from some sponges and encrusting algae.

California hydrocoral is one of the most collectable invertebrates on the West Coast. Not only is it a fine private decorative piece, a hydrocoral cluster also commands up to \$23 a pound by the time it hits the market in Chicago. But divers are causing some grave problems for this unique marine creature. As we continue to harvest the hydrocoral on a sport and commercial basis, marine scientists claim we know too little about *A. californica* to allow it to be harvested. We do, however, know enough of its life history to be concerned for its future.

Hydrocoral begins life as an oval-shaped 1mm long fuzzy larva known as a planula. This diminutive beast results from the fertilization of an egg in a female colony. The planula makes its way out of the mother colony and down onto the surrounding rocks, or will drift off into the water. Either way it soon is ready to settle on a nice clear spot.

Here it cements itself to the rock surface. This is the most crucial point in the life history of *Allopora*. As most divers know, it's not easy to find a bare spot of underwater rock. Sediment

and opportunistic algae rapidly cover horizontal surfaces, so the larva very often seeks out vertical, debris-free rock surfaces. This it must do while avoiding the depredations of all sorts of foraging invertebrates. Because of the harsh physical and biological elements, over 99 percent of all young *Allopora* disappear.

What starts out as a living speck soon develops the pores (cyclosystems) characteristic of corals. As calcium carbonate is absorbed from the water and secreted as a skeleton, the colony branches away from the rock and more cyclosystems develop. At this young age *A. californica* is growing at its fastest rate — less than one-quarter inch per year.

The living tissues of *Allopora* occur primarily at the cyclosystems. There are two kinds of polyps at the cyclosystem: a single gastrozoid for feeding, and four to eight dactylozooids for protection and food gathering. It is these small transparent polyps that give the hydrocoral its fuzzy appearance. When the colony is disturbed, the polyps retract, and often the polyps are extended for feeding only at night. All the cyclosystems in the colony are connected by an elaborate internal plumbing system.

After a few years of vigorous growth, the colony becomes sexually mature. *Allopora* has separate sexes, but they are impossible to distinguish in the field. Sperm are released from the male colonies early in the summer, and they are carried by currents to the female colonies. There the eggs are fertilized internally, and the planula larva crawls out several months later.

Allopora thrives in the best dive spots along the California coast. Like divers, it prefers clear, sediment-free water. The densest stands of hydrocoral are found some distance from shore, and since the colonies are sensitive to surface turbulence, they are usually most abundant below 30 feet. The deepest they have been found is 340 feet.

Undersea mounts, or pinnacles, support patchy growths of *A. californica*. In fact, Farnsworth Bank, on the south side of Santa Catalina Island, has been designated a "hydrocoral reserve." This area was selected by the State of California because its peculiar ecological features support a relatively massive hydrocoral community.

Actually, a single *Allopora* colony is a marine community in itself. There are three species of organisms that are referred to as "obligate commensals" because they are found only on the hydrocoral. The small polychaete worm, *Polydora alloporis*, burrows deeply down the bases of the branches; the snail *Pedicularia californica* matches the color of the coral as it rests peacefully on a branch; and the barnacle *Balanus nefeus* is a permanent resident.

Unfortunately, the pleasant and peaceful picture painted by the *Allopora* community and its protection at Farnsworth Bank does not extend much beyond the reserve. Outside this area (and possibly inside it) divers continually whack off hunks of colonies for souvenirs. From San Francisco to Baja, *A. californica* is in danger of losing its life and limbs to thoughtless divers intent upon collecting living specimens. In fact, in many areas (including the Carmel Bay reserve near Monterey) it is most difficult to find an un mutilated colony.

This hydrocoral is in a double jeopardy situation — its growth rate is so slow that we can easily overharvest it. An average colony seven to eight inches in diameter might need at least 50 years of growth. Then along comes a diver, and whack, part or all of it is gone.

The federal government is aware of this delicate issue, so presently the Bureau of Land Management is not issuing any commercial harvesting permits for federal waters until the hydrocoral is scientifically better understood. Yet the California Department of Fish and Game only spot checks commercial hauls of hydrocoral in an effort to calculate the annual harvest. CF&G does issue permits for the collection of *Allopora*, but the industry is not regulated at all. The state has jurisdiction to three miles offshore, beyond which the BLM takes over.

Two distressing issues become apparent when looking at CF&G commercial coral harvest figures. First, at least 20,000 pounds of *A. californica* are harvested annually by commercial divers in Southern California (Northern California populations are too sparse to support a commercial industry). Second, 40 percent of this annual harvest (8000 pounds) is taken *illegally* from federal waters. There are no figures available for the harvest of *Allopora* by sport divers, but if the harvest in Carmel Bay is an indication of what is happening elsewhere, the hydrocoral (including that in reserves) is in big trouble.

Clearly the issue is one of diver attitude. Commercial divers knowingly harvest hydrocoral in restricted areas. Sport divers collect the coral for personal, short-term gain with little regard for the value of an exquisite organism in its natural habitat.

Allopora californica occupies an extremely limited habitat — one that is highly sought after because of its immense aesthetic value. Many marine scientists and veteran divers believe that if the hydrocoral harvest in these areas continues at the current rate, the value of the West's most pristine and enjoyable underwater gardens will suffer tremendously. And if divers don't start practicing some conservation, we could drive California's most exquisite coral to the brink of extinction. ☹

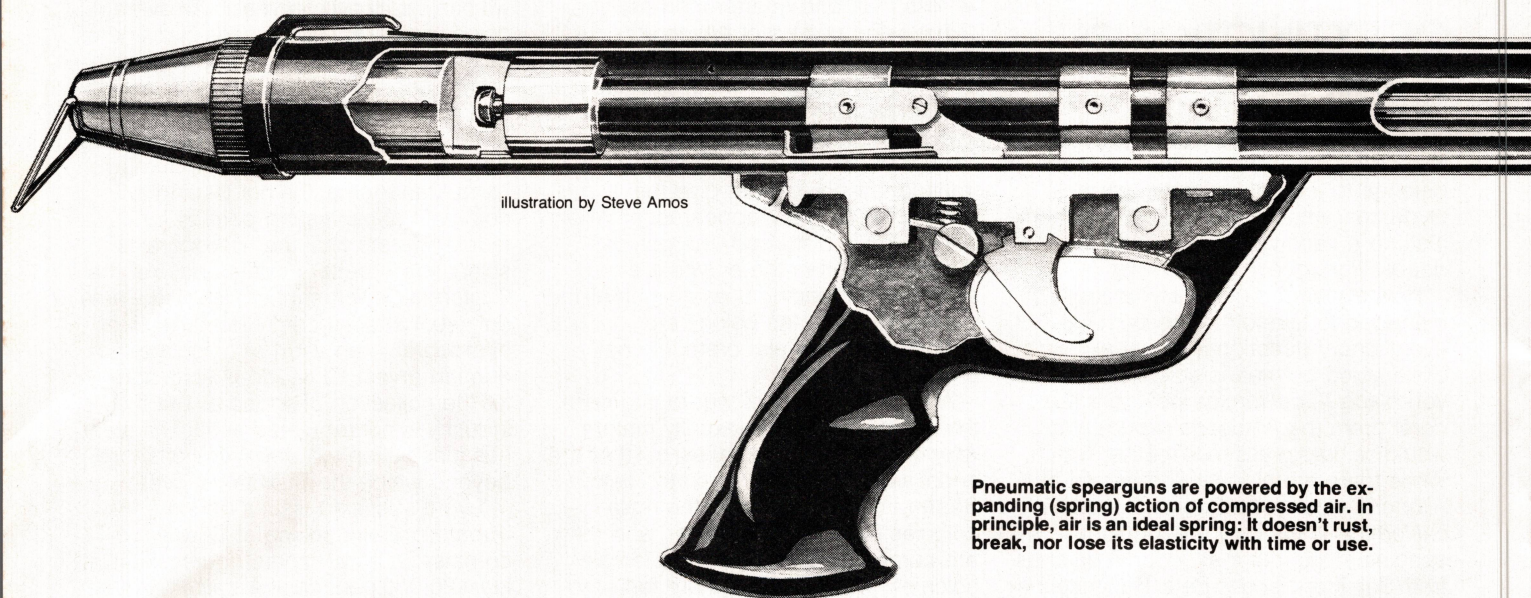
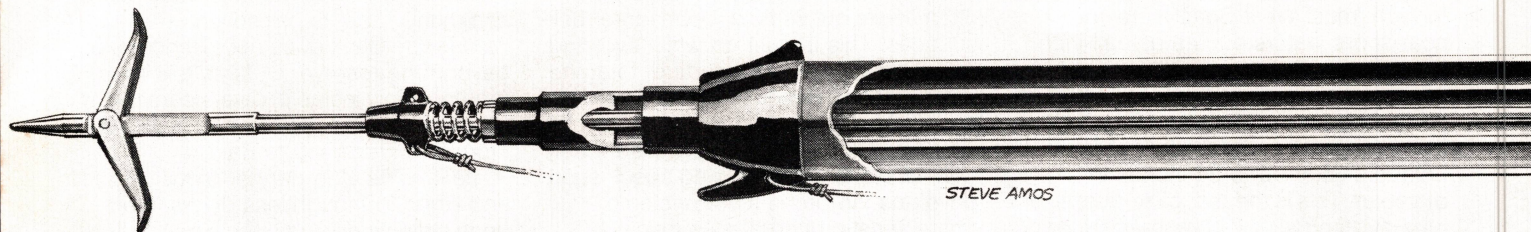


Illustration by Steve Amos

Pneumatic spearguns are powered by the expanding (spring) action of compressed air. In principle, air is an ideal spring: it doesn't rust, break, nor lose its elasticity with time or use.

Funny thing about pneumatic spearguns — not many divers know much about them, and even fewer divers have seen one. But almost everyone has an opinion on them. In discussions with local divers, it was also apparent that many misconceptions fill the air (and the water, too) about pneumatics. Some of the more common *fallacies* include:

"Pneumatic spearguns are powered by CO₂ cartridges." No! These guns are powered by compressed air, not CO₂. (*Pneumatic* means worked by or filled with compressed air.)

"Pneumatic guns are pressurized with air from a scuba tank." Generally false. Most guns should be pressurized only with a special, hand-operated, air pump. These pumps are similar in design to high quality bicycle tire pumps, and are supplied as standard equipment with pneumatic spearguns.

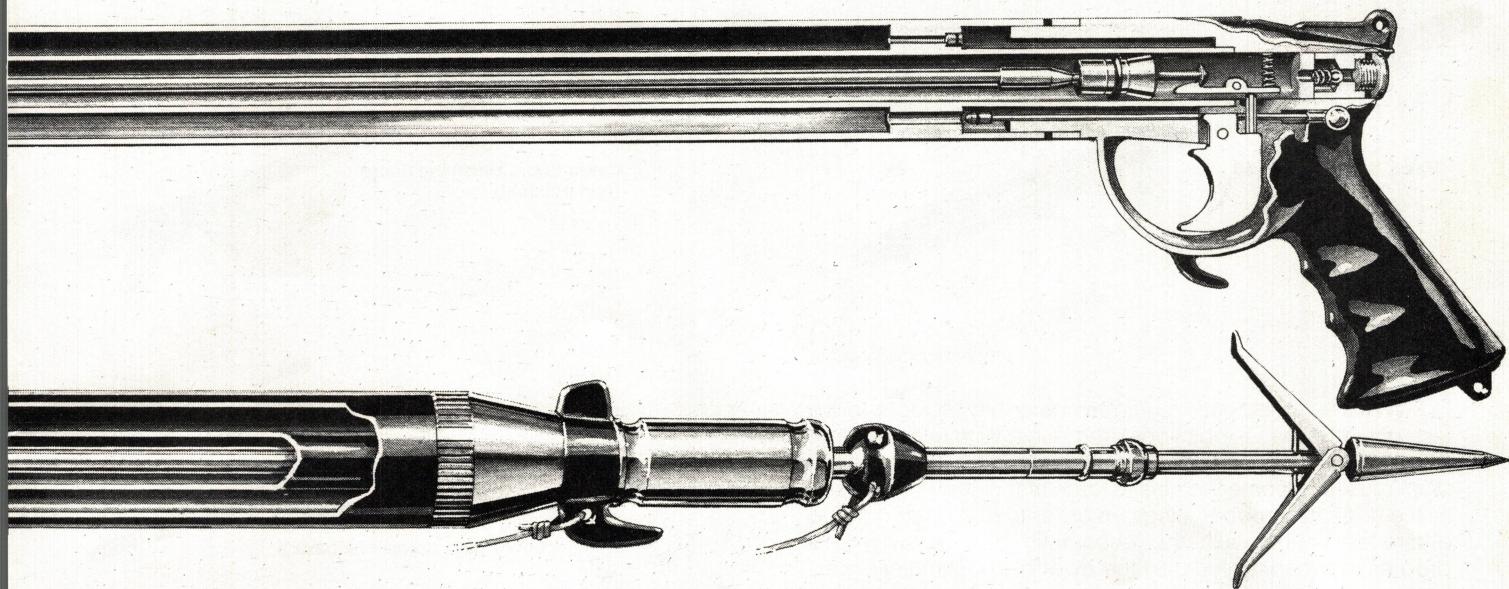
"Pneumatic spearguns require pumping up between shots, because of the air lost when the gun is fired." Absolutely false! Essentially no air is lost when a properly operating pneumatic gun is fired. The compressed air is stored within the gun and is normally only released when a discharge valve is intentionally opened (e.g. to reduce the gun's power by reducing the pressure, or to empty the gun prior to some maintenance operation). With essentially no air loss during normal use (a minor loss of air pressure can be expected with extensive use) a pneumatic gun will usually need recharging only once every year or two (and even then, only as part of routine maintenance).

"Pneumatic guns are new to the sport of spearfishing." Again, not true. Pneumatic spearguns have been in use for years, primarily in Europe. In fact, one manufacturer (Mares)

has been making spearfishing equipment for over 25 years, and its current line of pneumatic guns was introduced over 15 years ago. In Europe, pneumatic spearguns are very popular — it has been estimated that about 95 percent of the world class spearfishing competitors use pneumatic guns.

Before going any further, let's look at how a pneumatic gun works. The operating principle is based on the elastic (spring) action of compressed air. Energy can be stored in air by compressing it. Later, when the air is allowed to expand, this stored energy can be recovered and made to do work (e.g. propel a spear shaft through water). This same principle applies to other elastic materials: rubber bands, steel springs, etc. The advantages of an "air" spring are that it cannot rust, break, nor lose its elasticity with time or use. In principle, it is an ideal spring.

The basic design of a pneumatic speargun is quite simple, consisting of a cylinder, a piston, and a trigger mechanism. The cylinder is a piece of precision tubing that runs almost the entire length of the gun. The piston, which slides inside the cylinder, has an O-ring seal to contain the compressed air, an attachment at its aft end (compressed air side) to engage the trigger mechanism when fully compressed, and a coupling on its front face designed to grasp the rear end of the spear shaft. The trigger mechanism (in simple terms) is a combination of levers, which holds the piston in the loaded condition and releases the piston when fired, allowing the expanding air to push the piston and shaft up the cylinder to the muzzle end of the gun. The piston is stopped at the muzzle, preventing any loss of air, while the shaft continues on to the target. In



pneumatic spearguns

what they are and how they work

By George Cozens

the unloaded condition, the pressure of the stored, compressed air keeps the piston at the muzzle end. In loading the gun, the rear end of the shaft is inserted into the muzzle and is grasped by the piston. With a loading tool placed over the tip of the spear, the diver forces the shaft into the gun further pushing the piston down the cylinder (compressing the air to even higher pressures) until the piston latches with the trigger mechanism. The gun is then loaded and ready for firing.

In reality, pneumatic spearguns are more complicated than this basic design. All of the guns contain some oil mixed with the compressed air to provide lubrication for the piston and trigger mechanism, thus reducing friction and wear, and to maintain better O-ring seals. Rather than be restricted to just the air contained within the cylinder (which would put a severe limitation on the gun's power) additional air reservoirs are designed into pneumatic guns. With greater air capacity, sufficient power can be achieved without resorting to excessively high pressures. (Power depends on the air capacity and air pressure.)

In some models, pneumatic gun manufacturers have incorporated valves, which, when closed, isolate part of the air reservoir. This feature allows adjustment of the power of the gun without having to bleed off some of the air pressure to reduce power, or pump it up to increase power. Adjustable power is convenient when spearfishing conditions change (e.g. moving from open water to areas with rocks or coral, where high power is not needed and can be detrimental to shafts and spear points).

Another convenient feature that some guns (with adjusta-

ble power) exhibit is the use of one-way valves between different chambers of the air reservoir. These valves allow loading the shaft into the gun in progressive stages: As the shaft forces the piston down the cylinder, the air is compressed to higher pressures, equally, throughout the air reservoir. But if the diver relaxes when the shaft is only part way in, the pressure drops only slightly, before these valves close. The work the diver has accomplished to that point is not wasted, because the higher pressure air is now locked in the isolated reservoir. When this operation is done in quick, successive stages (like pumping), loading can be done more easily than when trying to force the shaft all the way into the gun with one continuous motion.

Other innovations found in some of these pneumatic guns are: exceptionally smooth acting triggers, for greater accuracy; specially designed muzzles to reduce the braking effect of the water, trapped between the shaft and the cylinder, as it is forced out upon firing; and extensive use of non-corroding materials — space age plastics, anodized aluminum, and stainless steel.

Pneumatic spearguns are pretty sophisticated weapons, when compared to rubber-powered guns, and represent a modern approach to spearfishing. So why haven't they attracted more attention in U.S. spearfishing circles? What are the "pros and cons" of pneumatic guns, and how do they compare with rubber-powered guns? These questions were asked of a number of experienced, spearfishing enthusiasts. Their answers were candid, and raised several points that are worth discussing:



Balco Sub, Torpedo 50

photography by George Cozens

POWER — Pneumatic guns are generally thought to be less powerful than rubber-powered guns. With either type of gun, power is limited to the diver's strength — because the diver must overcome the elastic force of the compressed air, or the stretched rubber slings, in order to load the gun. The difference is that with the pneumatic gun (even with a progressive-loading feature) the diver must ultimately overcome the force from the total air pressure, whereas the elastic force of a rubber gun can be divided into two or three increments (if the gun has two or three slings), with each increment approaching the diver's maximum strength, if desired. This doesn't necessarily mean that rubber guns are two to three times more powerful. Other factors should be considered. Efficiency is one.

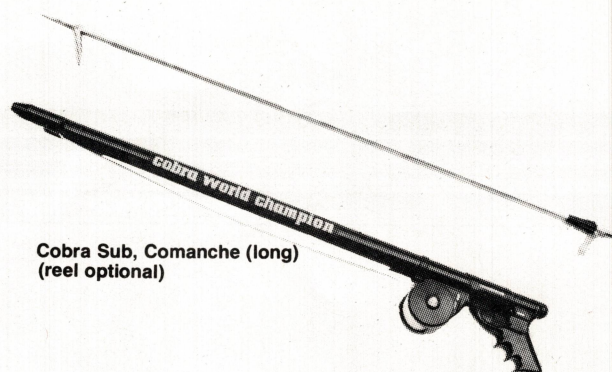
Pneumatic guns are more efficient than rubber guns. In relating loading effort to propulsion, pneumatics rate about 90 to 95 percent, while the rubber-powered guns rate about 70 to 75 percent.

Leverage is another factor. In loading a pneumatic gun the diver's arms are more outstretched, offering greater leverage, as compared to loading a rubber gun, where the diver's arms are close to the body when the slings are under maximum tension. An important point to note is that in comparing the power of pneumatic vs rubber guns, to be fair we should consider guns of comparable size. The largest pneumatic gun in this article is about four feet long. It would be unfair to compare it with a six foot multi-band, rubber-powered gun.

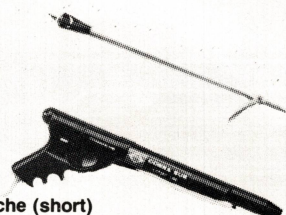
At the DEMA (Diving Equipment Manufacturers Association) trade show earlier this year, one pneumatic gun manufacturer (Mares) conducted a comparison test between its largest pneumatic gun and a very popular three-band rubber-powered gun of equal length. Both guns were tested in "off-the-shelf" condition, in a swimming pool, under static conditions (i.e. guns and target were held rigidly in place). The pneumatic gun proved to have 30 percent more penetrating power than the "comparable" rubber-powered gun using all three slings, 60 per cent more powerful than the same gun using two slings, and 150 percent more powerful than the same gun using only one sling.

Under normal conditions both types of guns lose some power, although for different reasons. In extensive tests conducted by Aqua-Craft a couple of years ago, rubber slings exhibited about 15 percent loss of power after 20 minutes under tension and, after firing, took about an hour to regain their full elasticity. On the other hand, pneumatic guns lose power with depth. One atmosphere of air pressure is nullified for each 33 feet of depth in seawater (due to water pressure acting on the gun). For guns with normal working pressures of 15 to 25 atmospheres, this effective pressure loss amounts to from seven percent to four percent loss of power, respectively, for each additional 33 feet of depth.

LOADING — Since the diver must ultimately overcome the force of the total air pressure in order to load a pneumatic gun, some spearfishermen believe that the diver's own strength



Cobra Sub, Comanche (long)
(reel optional)



Cobra Sub, Comanche (short)



Cressi-Sub, Mach 0.9



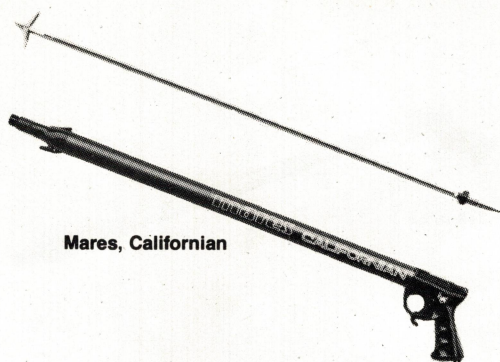
Cressi-Sub, SL 70



GSD Dynamic, Katiuscia 807



GSD Dynamic, Katiuscia 808



Mares, Californian

severely limits the gun's power. This argument has already been discussed. Even with the "progressive-loading" feature of some pneumatic guns and the leverage advantage, loading a pneumatic does require a certain degree of manual dexterity and strength. But, so does a rubber gun.

Unlike a rubber gun, as soon as the shaft is inserted into the muzzle of a pneumatic gun, the diver feels resistance — a repelling force that increases as the shaft is inserted deeper. To make loading a long gun easier, the gun butt or handle can be placed on the instep of the diver's foot, the muzzle supported with one hand, and the second hand (equipped with a plastic handle-like device called a hand loader) used to compress the shaft into the gun barrel. Shorter guns can be loaded in a similar manner, except that the gun butt or handle can be supported on the diver's thigh.

MAINTENANCE — It is generally assumed that because pneumatic guns are more complex than rubber-powered guns, they require more maintenance. This assumption may be true for some manufacturers of pneumatic guns (Nemrod, Technisub, and Cobra Sub) who rely on the diver to do his or her own service. These manufacturers supply parts lists, repair or service instructions for such operations as changing the oil (recommended once every year or two), inspecting and/or replacing O-rings and other parts, etc.

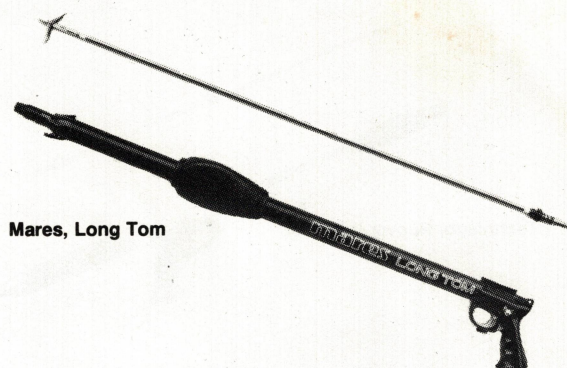
The Dynamic gun (Aqua-Craft) falls partly into this category — instructions and drawings are included with each gun — but Aqua-Craft also provides some service: unit exchange for damaged guns, and component replacement (next year).

Mares has a different approach. They recommend their guns be sent to them every two years for cleaning, internal inspection, oil change and repressurization. The charge for this service is \$12 plus shipping — which, as they claim, might well be cheaper and easier than replacing rubber slings for two years.

For all pneumatic guns, routine maintenance consists merely of rinsing after use, keeping sand and other abrasive material out of the cylinder, and storing in a vertical position with the muzzle down (to keep the piston seals oiled).

ACCURACY — Not many spearfishermen would argue with the point that pneumatic guns are inherently more accurate than rubber-powered guns. Pneumatics, by their design, propel the shaft with an even, on-axis thrust down the entire length of the cylinder — thus creating less vibration and a straighter trajectory than that of a rubber-powered gun. This may be one reason why pneumatics are so popular in European competition.

COST — No doubt about it, the initial cost of a pneumatic gun is higher than that of a comparable rubber-powered gun. The price difference has been closing in recent years, but it still exists. A comparison of features and advantages/disadvantages of both types of spearguns may make pneumatic guns worth the extra initial cost. It appears that most of the pneumatic gun manufacturers have paid careful attention to materials that resist corrosion and electrolysis, and this may



Mares, Long Tom



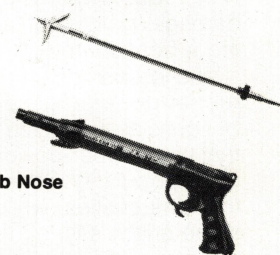
Mares, Sharp Shooter



Mares, Frontiersman



Mares, Shortie



Mares, Snub Nose



Technisub, Nuovo Jaguar 46



Technisub, Nuovo Jaguar 33

add years to their life and reduce future maintenance costs.

USE — In use, pneumatics are very similar in many respects to rubber-powered guns. There are some differences, however. Once the diver gets used to loading a pneumatic, the loading-firing-reloading sequence can go much more quickly than with rubber guns. This may be another reason for the pneumatics' popularity in European competition. As with rubber guns, pneumatics should only be loaded and fired *in the water*. Entering the water can be simplified if the shaft is placed next to the gun barrel and the shock line wrapped around both. This arrangement allows easy handling of both gun and shaft with only one hand.

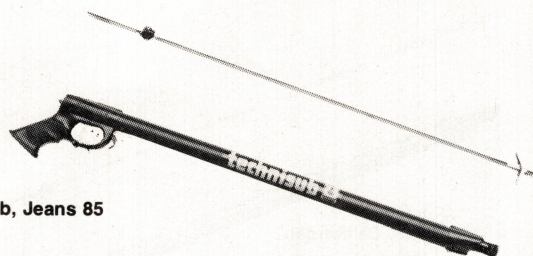
Movement through the water is easier with most pneumatic guns because there are no slings to create drag. Balance and turning resistance depend on the gun design — true for both rubber and pneumatic guns. Guns with handles at the rear generally have poorer balance (because the shaft is extended so far from the handle) and offer greater resistance to changing direction in the water. But placement of the handle at the rear increases the gun's accuracy and range (it becomes an extension of the diver's arm). Mid-handle guns, on the other hand, offer better balance and less turning resistance, but possibly less range and accuracy because the gun is held so much closer to the diver's body.

SAFETY — Safety procedures are similar with both pneumatic and rubber-powered guns. One notable difference is that when firing a pneumatic gun, you don't have to worry about keeping your fingers out of the path of the wish-bones. With any type of speargun, however, it is always good practice to: Load and fire a speargun only in the water; keep the safety on until ready to fire; fire only when you can see clearly the range the shaft will travel, and never in the direction of boats, divers, swimmers, or animals you do not wish to hit; avoid overloading your gun with excessive air pressure, or with rubbers that are too short or too thick; and prevent damage (to your gun and yourself) by never loading or shooting a bent shaft.

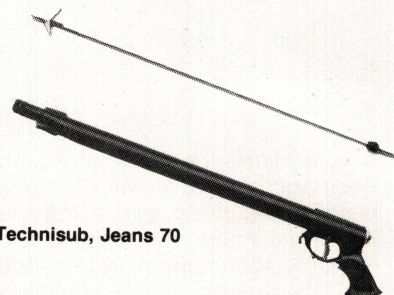
The foregoing comparisons between pneumatic guns and rubber-powered guns were not intended to downgrade rubber guns and eulogize pneumatic guns, but rather to point out that the rubber-powered speargun — which enjoys such great popularity in this country — does have some flaws and that pneumatics, while not perfect, may not be as bad as some critics say.

No one gun is right for every type of spearfishing application, or for every type of spearfisherman. Some applications and some divers may be better suited to rubber-powered guns, while other applications and other divers are better suited to pneumatic guns.

And, as Confucius wisely stated so many years ago, "You pay your money, and you take your choice!"



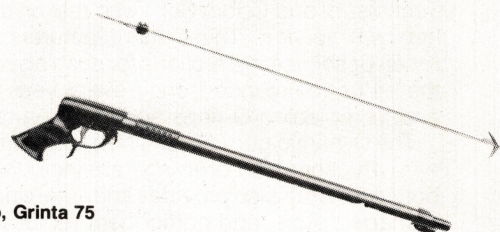
Technisub, Jeans 85



Technisub, Jeans 70



Technisub, Jeans 55



Technisub, Grinta 75

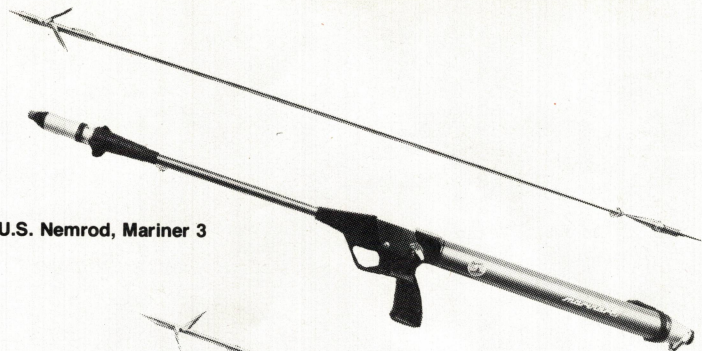


Technisub, Grinta 60



Technisub, Mini-Grinta

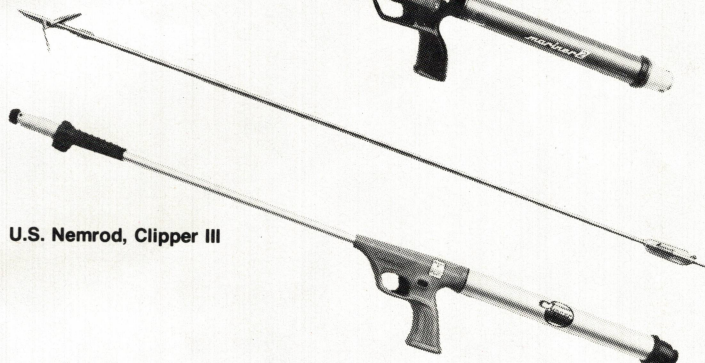
U.S. Nemrod, Mariner 3



U.S. Nemrod, Mariner 2



U.S. Nemrod, Clipper III



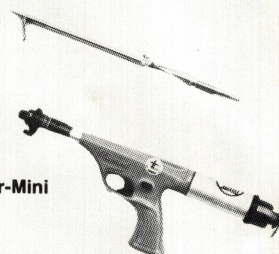
U.S. Nemrod, Clipper II



U.S. Nemrod, Clipper I



U.S. Nemrod, Clipper-Mini



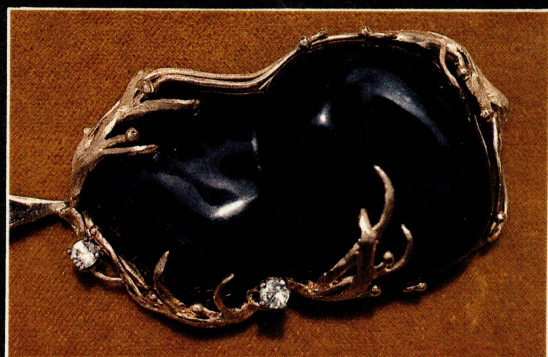
PNEUMATIC SPEARGUN MANUFACTURERS

MANUFACTURER	MODEL	GUN WEIGHT IN AIR (lbs.) (without shaft)	LENGTH (inches) (without shaft)	SHAFT LENGTH	RETAIL PRICE
Balco Sub U.S. Distributor, Marlera Imports 228 Eight Avenue New York, NY 10011	Torpedo 50	2.7	27	26 1/8	\$ 95.00
	Torpedo 70	3.2	35	26 1/8	110.00
	Torpedo 90	3.7	42	26 1/8	130.00
Cobra Sub U.S. Distributor, Aqua-Sub, Inc. P.O. Box 2013 Flushing, NY 11352	Comanche (long)	2.7	39	41 1/2	120.00
	Comanche (short)	1.2	17 1/2	17 1/2	100.00
	Comanche (medium)	2.0	32	36	110.00
Cressi-Sub 971 S.W. First St. Miami, FL 33130	Mach 0.7	2.0	25 1/2	24 1/2	95.00
	Mach 0.9	2.5	34 1/2	33 1/2	105.00
	Mach 1.1	3.5	41 1/2	39 1/2	115.00
	SL 40	1.7	16	14 1/2	90.00
	SL 55	2.0	24	23	95.00
	SL 70	2.5	28	27	100.00
	SL 95	3.0	37	35	110.00
GSD Dynamic U.S. Distributor, Aqua-Craft 3280 Kurtz Street San Diego, CA 92110	Katiuscia 808	2.6	33	26	170.00
	Katiuscia 807	2.2	26	20	156.00
Mares 722 Genevieve St. Suite M Solana Beach, CA 92075	Long Tom	2.9	41 1/2	39	195.00
	Sharp Shooter	1.8	29	26 1/2	165.00
	Californian	2.0	36	34 1/2	129.00
	Frontiersman	1.7	28	26 1/2	115.00
	Shortie	1.4	23	21	99.00
	Snub Nose	1.2	17	15	95.00
Technisub U.S. Distributor, U.S. Divers Co. 3323 W. Warner Ave. Santa Ana, CA 92702	Nuovo Jaguar	2.7	46	41	N/A
	Nuovo Jaguar	2.3	33	28	N/A
	Jeans 85	2.2	35	34	N/A
	Jeans 70	1.9	30	29	N/A
	Jeans 55	1.6	24	21	N/A
	Grinta 75VP	1.5	32	31 1/2	N/A
	Grinta 60	1.2	26	25	N/A
	Mini-Grinta	1.0	20	18	N/A
U.S. Nemrod, Inc. P.O. Box 5188 2315 Whitney Ave. Hamden, CT 06518	Mariner 3	5.4	48	51	226.80
	Mariner 2	4.7	36 1/2	38	221.30
	Clipper III	3.0	48 1/2	50	124.00
	Clipper II	2.4	35	33	121.20
	Clipper I	2.2	27	22	115.20
	Clipper-Mini	1.8	19	14 1/2	104.50



photograph by Paul Tzimodoulis

BLACK CORAL



courtesy Maui Divers

The best quality black coral comes from Hawaii where it grows on deep slopes and drop-offs.



A KEEPSAKE FROM
THE SEAS OF TIME
By Ellsworth Boyd



and depletion. The continued growth of the precious coral industry in Hawaii, and U.S. regulations that mandate management of U.S. Fisheries, are two contributing factors which led to the development of a plan for resource management of black coral.

Now, officially classified as a "fishery," regulatory measures in Hawaii determine who can harvest it commercially, how much they can harvest, and what sizes they may take. Managed by the state Fish and Game Department, a four foot height limit has been established as the minimum legal size.

Conservation measures are important for the future growth and development of the fishery. The future of the precious coral industry, whether or not its potential can be realized, will largely depend on the discoveries of more coral beds and the continued development of efficient methods of collection and management.

In Hawaii, commercial beds of black coral were discovered over 20 years ago and have since been worked by scuba divers at depths between 150 and 250 feet. There are about 15 commercial black coral divers in Hawaii who dive regularly. Several dozen more sport divers retrieve it occasionally, but they take only an incidental quantity.

Treacherous tides and currents, coupled with the great depth, make black coral diving a short-lived occupation. Few divers continue for more than ten years because of bends and other diver related accidents.

Hawaii is one of the few places in the world where black coral is commercially gathered and exported. Exquisite jewelry appears in many showcases and shop windows throughout the 50th state.

Large beds of *Antipathes grandis* grow off the coast of the old whaling village of Lahaina, near Maui, and off the southern coast of Kauai. Smaller beds have been reported off Sandy Beach, Oahu, and off South Point and Mahukona on the big island of Hawaii. Scattered colonies are found off almost all Hawaiian coasts at depths below 100 feet.

Some divers are misled by a theory that the deeper black coral grows, the better its quality. There are poor specimens of low quality in both shallow and deep waters. In Hawaii the best quality colonies are found from 50 to 300 feet.

In shallow water, encrustations are common, and the black coral skeleton is not of even consistency. There are more predators clinging to and attacking the black coral in shallow waters than in the deeper seas. But in the deeper waters, species tend to be smaller and more brittle.

Black corals are found in tropical seas all over the world, but the biggest and best quality still comes from Hawaii. It grows best in areas of subdued sunlight and twilight-free waters. That's why it's

often found on deep slopes, drop-offs, and sometimes in caves.

Black corals belong to the class Anthozoa, in the phylum Coelenterata. Other anthozoans include other reef corals, sea anemones, seapens, etc.

Black coral polyps secrete a skeletal substance similar in function to bones in humans. The skeleton consists of proteins and provides the structural support for the rust-colored polyps. The skeleton of the coral appears black because it's opaque to light, but when thinly cut or powdered the true rust-brown color appears.

Although some divers refer to black coral as "trees," they are really colonies formed by thousands of tiny animals which secrete a proteinaceous skeleton.

The rough exterior of black corals comes from microscopic spines in the skeleton. This distinguishes them from the gorgonian corals which lack these spines. When they are cut into cross sections, many species reveal rings. Marine biologists have discovered that in at least one species, the rings are laid down annually, just like trees.

Hawaiian waters don't maintain exclusive rights to this fascinating deepsea product. It has even been found in California waters. While piloting the Westinghouse research submarine, *Deepstar*, Ed Buffington cruised over an extensive bed of black coral on the continental slope near Coronado Canyon, off Southern California. Spotting them at 1300 feet, the *Deepstar* pilot described the coral as looking "like sooty tumbleweeds." His study revealed that the colonies were clustered on bottoms free of sediment and abrasive irritants, where currents flowed from one-half to two knots.

Buffington concluded that the California species survive best on rugged, clean, calcareous bottoms, 130 feet or deeper. In 100 feet or less, colonies grew in caves or beneath overhangs where light was suppressed.

Dr. Richard W. (Rick) Grigg of the Hawaii Institute of Marine Biology, University of Hawaii, is one of the world's foremost authorities on precious corals. He has made over 800 precious coral dives all over the world. Although Dr. Grigg studied and dived for red, pink, gold and bamboo coral, his initial endeavors in the early 1960's focused upon the biology of black coral. In 1970 a research grant was awarded to the University of Hawaii by the U.S. National Sea Grant Program to investigate the ecology of precious corals in Hawaii. Further studies took Dr. Grigg to the Western Caroline Islands, Micronesia, Japan, Taiwan and Okinawa. But Hawaiian waters command most of his diving time and research now while he continues his investigations into



Originally discovered by the Mayans, who cut lucky charms from it, and later cherished by kings who brandished scepters made of it, black coral has for centuries been an appealing keepsake from the sea.

Many divers today are fascinated by *Antipathes grandis* (the scientific name for black coral). They usually want to know where it's found, how to dive for it, and how to shape and polish it into stunning pieces of jewelry.

It's surprising how little has been written about black coral. Divers are usually amazed to learn that black corals are found in all oceans of the world, and of the 150 species, only four have been used commercially for jewelry manufacture.

Although precious coral fishery dates back to antiquity, there's been little attempt throughout history to manage the collection of it. The pattern in the past, in different parts of the world, has been exploration, discovery, exploitation

the ecology and fishery potential of the precious corals.

Black coral is plain and unattractive in its rough, dried state, but with sandpaper, jeweler's rouge and a buffing machine, it transforms into a shapely, delicate gem. It can be worked in three or four days after harvesting, but it's preferable to wait about six weeks in order to minimize cracking.

The finished products are absolutely fascinating. Finely carved, exquisite and unusual, black coral is a gem of beauty and individuality. Hand-polished pieces aren't as glossy as those buffed on machines, where a matchless, radiant finish emerges with little effort.

Just as the finished products draw a variety of prices, so does the raw material. Prices vary on different islands and in various parts of the world, and like many products today, the price is often "whatever the market will bear." Quality of course is important; some trees are poor to fair, while others are good to excellent. Those with thick bases, an inch or more in diameter, are prize trophies suitable for rings. Black coral, like ivory and jade, is sold according to quality, size and demand.

When it comes to nature versus man-made jewelry creations, black coral sustains its own stunning elegance. Some of the handsomest pieces come from Maui Divers of Hawaii, Ltd., the largest coral jewelry manufacturer in the world. Black coral creations are designed and produced in the Honolulu factory, then distributed through a chain of specialized shops.

The raw material — twigs, branches, stems and whole trees — is sorted in the receiving room of the main warehouse. Each piece of gem coral is weighed and selected according to size and quality. Then the cutting and shaping is done in a pattern to bring out the very best in each piece. Special designers shape each one on an individual basis, stressing line, form and dimension.

Although Maui Divers employs skilled artisans to fashion original creations, simple designs can be achieved by the average diver in a home workshop. I learned a lot about polishing and working with black coral from Joe Felsinger of Newark, Delaware. Felsinger was diving for black coral and creating beautiful jewelry from it 20 years ago, when many divers never knew the precious product existed.

Felsinger waits about six weeks for his black coral to dry thoroughly. Then he cuts and separates the tree into three different piles: the base, branches, and the branch ends. The branch ends are the extremities of the tree that measure less than three-sixteenths of an inch in thickness. These can be used in flower

arrangements, jewelry displays or aquariums. The tips of the branch ends have a unique beauty all their own, appearing rust-brown, the true color of the polyp. If the branch ends are encrusted with other coral or sponge growth, you can soak them for two hours in a solution of 50-50 bleach and water, then rinse under the tap.

The branches vary in size from three-sixteenths of an inch on up. Smaller trees might have branches only one-quarter inch thick, while the larger, more prized specimens might have limbs over one inch thick. Felsinger sorts out the V-shaped or forked limbs that he calls "free-form branches." The large ones are popular for pins, especially when set with stones or pearls, while the smaller V-shapes make dainty earrings.

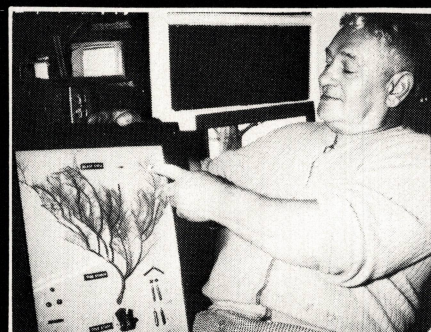
The remaining base of the tree can be used for rings if it's thick enough, or cut into nuggets for pendants. Growth rings are more predominant on the thick cuts of black coral and add a delicate dimension to finished pieces.

The only limit in working with the various parts of the black coral tree is the imagination of the lapidary. If you possess true artistic talent, you might be interested in carving it. Black coral is

easy to work with, using high speed miniature power tools.

There are many ways of polishing black coral, but most lapidaries agree on starting with a wet belt sander using a 220 mesh silicon carbide belt to remove the rough outer layer. Then change to a 400 or 600 mesh silicon carbide belt. Be careful not to get heavy handed and don't be in a hurry. Undue friction causes reddish-brown spots to appear, blemishing the piece. (Also it's a good idea to wear a gauze mask over your nose and mouth to screen out the fine dust.)

Next, apply tripoli, in the stick form, to a fresh cotton flannel buff and gently buff



photographs by Ellsworth Boyd



the black coral. Tripoli, a very inexpensive, rough polishing compound, is used to polish metal as well as other corals and stones. Don't overload the buff with tripoli. If you do, streaks will appear on the coral and it will take additional time to buff them off. Again, be careful not to overheat the piece.

You'll get a very good polish from the tripoli, but to obtain the ultimate, there's one more step. Wash the coral in a mild detergent and water in order to remove all grit and tripoli before final polishing. Using a new, clean, cotton flannel buff, apply white jeweler's rouge, in stick form, and gently polish the piece. This produces a very fine, high-gloss finish.

Some lapidaries use black jeweler's rouge, but it really doesn't matter which one you choose. By using the white you can accentuate the ring structure of the coral. Black rouge doesn't bring out the rings as readily as the white.

If you want to make cabochons from the black coral nuggets, use the same polishing techniques I outlined above. Use a very fine grinding wheel with plenty of water to shape the cabochon before polishing. When preparing to dip the black coral, be sure not to get it hot. Warm it gradually and only enough to help the

dop wax adhere. Too much heat will burn the coral and reddish-brown blemishes will appear.

If you want to tumble black coral — usually the base nuggets and free-form branches — start with 30 mesh silicon carbide grits for 24 hours. Then switch to 80 mesh for 24 hours, and finally 220 mesh for 24 hours. The tumbled pieces should then be ready for polishing at the tripoli stage.

Divers are constantly asking me, "Isn't there a simpler way for me to polish my black coral without going out and buying all that expensive lapidary equipment?"

Yes, there is, if you have the time and patience. You'll need three or four grades of sandpaper. Start with number 150 grade and sand the piece thoroughly. Then use number 320, then number 500, and finally number 600. The numbers of the sandpaper don't have to be exactly the ones I listed, but the idea is to go from rough to fine, and then to the finest grade to get the black coral good and smooth. The paper can be dry or wet.

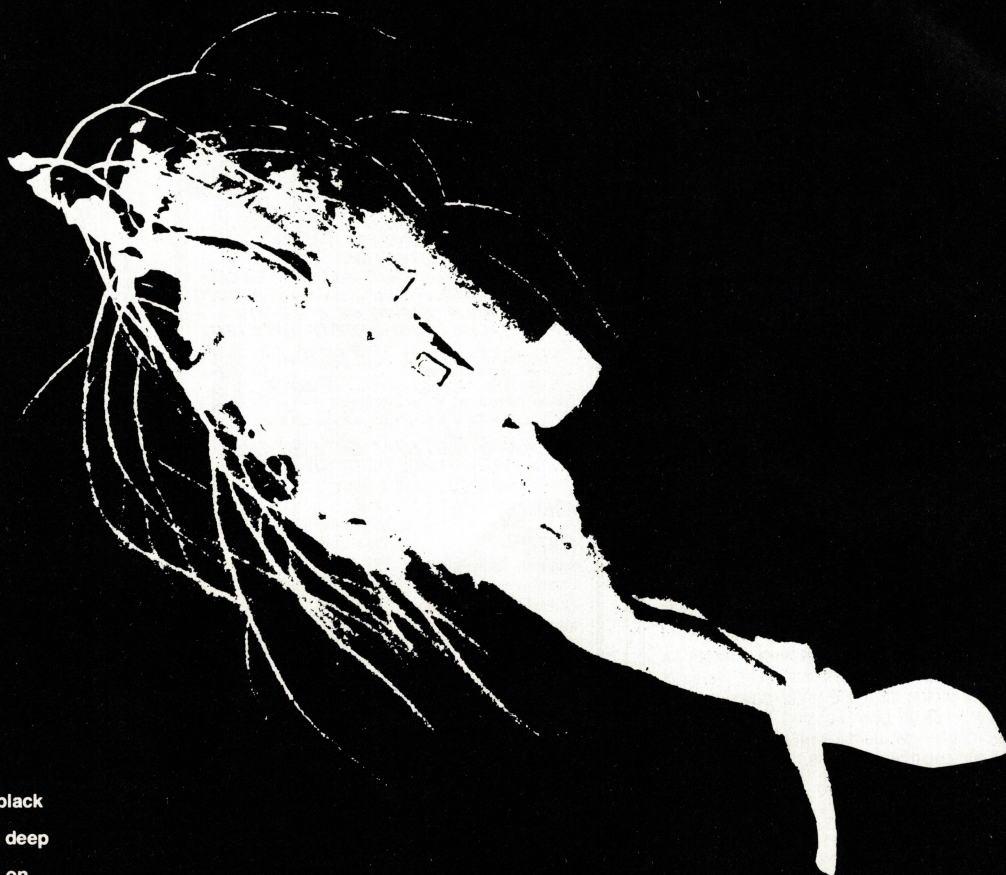
Next you're ready to buff it, but you can skip the tripoli stage and go right to the white or black jeweler's rouge (about 75 cents a stick — one stick will last for years). But would you believe that instead

of the rouge you could use auto polish, hair oil or toothpaste?!

Most divers don't own a hobbyist's buffing machine, but they might have a grindstone for sharpening tools that's interchangeable with a buffer. Or better still, most homeowners have an electric drill. Just shop around in the hobby stores of lapidary shops for a small buffer that fits into the drill just like a drill bit. Or, you could use the buffer you polish your car with. It's possible to buff the piece by hand, but the high speed is what gives it a brilliant finish. Again, be careful not to burn it. To do a small piece of coral, it usually takes about one hour, including all stages of sanding and final buffing. Time and patience will give you a beautiful finished product.

Perhaps in this age of over-mechanization we need to be reminded to behold that which is most natural, such as black coral jewelry from the seas of time. Therefore, it is with reverence for nature that we use her treasure, and in that way we hope it will be everlasting. 

For a price list on both rough and polished black coral pieces, write to the author at: Rt. 2, Box 408, White Hall, MD 21161.



Joe Felsinger (top left), pioneer black coral diver, displays some specimens he retrieved from the deep over 20 years ago. Ken Bailey (left), a marine biologist working on Andros Island, has brought up a large coral tree for study purposes.

photograph by Paul Tzimoulis



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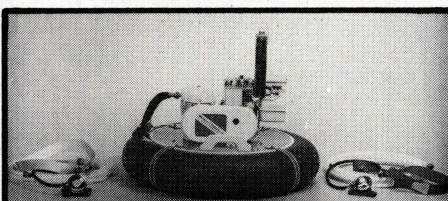
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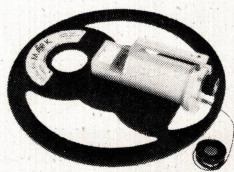


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OUR WORLD-U/W SCHOLARSHIP

The Our World-Underwater scholarship is awarded to outstanding individuals planning to make a career in one of the water-related disciplines. This year's outstanding young diver is Susan Schoen of Bronxville, New York. The purpose of the scholarship is to further the education of these individuals by practical exposure to various fields of underwater endeavors and to leaders in those fields.

Men and women between the ages of 18 and 25 are encouraged to apply. The application will explain other requirements in detail. Applications must be returned by December 31, 1979. All applications will be reviewed by the Our World-Underwater Scholarship Society. The recipient will be introduced at the Our World-Underwater symposium in May.

To request an application, write: Our World-Underwater Scholarship Society, P.O. Box 4428, Chicago, IL 60680.

SLAM

On Sunday, March 4, 1979 in Monterey, Calif., YMCA instructors and divers completed work on a two and one-half day pilot course called SLAM (Scuba Lifesaving and Accident Management). Since that time, the course has become one of the most popular in the YMCA's curriculum of continuing diver education.

Under the sponsorship of NOAA (National Oceanic and Atmospheric Administration) and CNCA (Council for National Cooperation in Aquatics), a research team was convened in late 1977 by Bob Smith of the National YMCA Center for Underwater Activities. The purpose of this project was to consolidate and validate the latest state-of-the-art in diver rescue and resuscitation. Almost a dozen agencies in the United States and Canada with an interest in scuba lifesaving were represented.

A 76 page manual containing over 40 photographic illustrations of SLAM techniques was produced and is now available through the National YMCA Center for Underwater Activities. The technology has been integrated into the YMCA SLAM course and is also being evaluated by other national scuba training agencies.

Many of the techniques developed through the SLAM project represent a breakthrough in state-of-the-art in this vital area. For information on where to find SLAM courses, contact: YMCA U/W Activities Program, Box 1547, Key West, FL 33040. Or call (305) 294-5288.

PDIC TRAINING CENTER

The Professional Diving Instructor College (PDIC) located in Jacksonville, Florida, has announced a new series of

instructor training courses. The Florida PDIC, a licensed affiliate of Ed Brawley's PDIC, offers a ten week resident course, a two week course, and a special weekend training program for students within easy driving or flying distance.

For a free college catalogue, write: Florida PDIC, 5627 Arlington Rd., Jacksonville, FL 32211.

DIVING MEDICINE IN DEPTH

A new concept in diving medical education, called Diving Medicine in Depth (DMD), encompasses six different programs tailored to suit the needs of specialized interest groups within the diving and medical communities.

The DMD — Basic Program, formerly known as the Physicians' Program in Undersea Medicine, will be presented at the post-graduate medical education level for physicians, nurses, paramedical personnel and emergency medical technicians. It is the most highly accredited program of its type currently being offered to the medical diving community. In 1980 the basic DMD will be conducted on Bonaire, Roatan and in the South Pacific.

The DMD — Advanced Program will provide four different in-depth courses of instruction that will cover the state-of-the-art in the field of diving medicine and physiology. This program is scheduled to be conducted the first week of November each year at the Riding Rock Inn on San Salvador Island in the Bahamas.

Also to be conducted at Riding Rock Inn in November each year is the DMD-Instructor Program. This program is designed to provide the scuba instructor/diver master a deeper understanding of diving medicine and physiology.

For information, contact: Program Coordinator, Dept. 1252, Human Underwater Biology, P.O. Box 5893, San Antonio, TX 78201.

OCEAN DUMPING

Recent relocation of designated ocean disposal sites off south Florida will prevent future dumping operations from harming the area's coral reefs. Federal agencies have taken this action as a result of intensive lobbying by The Marine Wilderness Society, a national marine conservation organization.

On April 10th, the Army Corps of Engineers commanding district engineer agreed in writing to restrict future ocean dumping in south Florida to an interim location 400 feet deep until a new permanent disposal site has been designated beyond the continental shelf.

The Marine Wilderness Society, a membership organization dedicated to the protection of our living seas, now plans to pursue similar dumping site relocations throughout the U.S. For more information on this and other projects, write P.O. Box 943, Miami, FL 33165.

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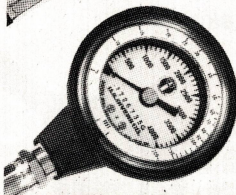
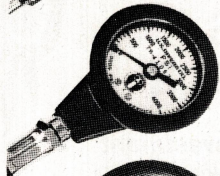
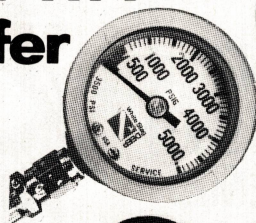
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DOLPHINS FOR LOCH NESS BY ROBERT DAVIDSSON

Will three Atlantic bottlenose dolphins be able to unlock the mystery of the Loch Ness monster in Scotland?

The Boston-based Academy of Applied Sciences believes that camera-packing porpoises may be the key to solving the monster legend, and are training three dolphins for the task at the Theater of the Sea in Islamorada, Florida.

Current academy plans call for two dolphins, Susie and Sammy, and one backup dolphin to be trained to carry light-weight camera and strobe units on specially fitted harnesses under the loch for limited photographic forays, once a day. They will search out and photograph the large unknown animals — the Loch Ness monsters — that supposedly live in the landlocked body of water.

Training sessions are being conducted by Harold "Rusty" Nielsen at a rented tidal pool behind the Florida Keys marine entertainment facility. The dolphins being used are females, between 15 and 18 years of age, veteran performers.

Wearing the specially fitted harnesses, the dolphins will be trained to assume straight-on positions conducive to photography, after which they will be asked to return to the trainer.

The Academy of Applied Sciences is a non-profit education and research association of about 350 investors, business people, university researchers and lawyers concerned with the field of scientific invention and innovation. Its studies of Loch Ness have been funded by private subsidy and conducted by volunteers at their own expense.

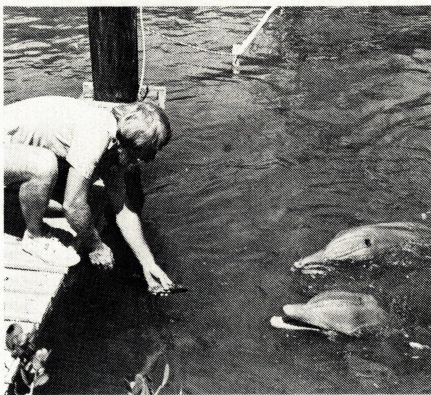
Ever since the days of St. Columba, the patron saint of Scotland, reports have come from the wild Highlands of a monster which lives in Loch Ness.

According to medieval chronicles, St. Columba himself was said to have encountered a "Leviathan creature" in the loch. And, since 1933, a total of 258 sightings have been recorded.

Constant camera surveillance, aerial photography, sonar and submarines have all been used in an effort to positively identify the monster. So far, "Nessie" has eluded all attempts to prove its existence.

The academy launched three major expeditions to Loch Ness to locate the monster in 1970, 1972 and 1975-76. In each expedition the academy claimed to have made sonar contacts and presented murky photographs, but failed to identify the monster or provide absolute proof to the scientific community.

The academy believes the dolphins' intelligence and innate underwater sensory abilities will enable them to succeed where man has failed.



Three roadblocks confronting the project are the natural problems of cold temperature and lack of salinity in the loch, and the behavior of dolphins in the strange environment. Loch Ness is a freshwater lake with a maximum reported depth of 975 feet. The waters of the loch are cold — with an average temperature of about 45 degrees — and extremely murky. Dolphins are usually found in temperatures from 55 to 85°F.

Academy spokesmen also stated that during both their training in Islamorada and Loch Ness the dolphins would operate under the supervision of a trainer and veterinarian specializing in marine mammal physiology. At Loch Ness, plans call for the dolphins to spend most of their time in filtered, heated saltwater habitats.

In a prepared statement, Robert H. Rines, the academy president, said, "Although the dolphins we are training are pre-Marine Act animals, we are planning the mission as if they were subjected to the most stringent conditions of the act, and are insisting on compliance with both the letter and spirit of all U.S. and British laws and humane requirements." »

FLASHLIGHT FISH

A rare species of flashlight fish (*Kryptophanaron alfredi*) recently became a resident of the Steinhart Aquarium in San Francisco. Aquarium director, Dr. John McCosker, collected the fish on a scientific expedition off Grand Cayman.

A member of the family Anomalopidae ("abnormal eye"), the fish has a special crescent-shaped organ under each eye, filled with millions of light-emitting symbiotic bacteria. The fish is adapted to life in ocean depths of 500 feet or more. »

DIVING MEDIC COURSE

The second YMCA Diving Medic Course will be held at the State University of New York on three consecutive week-ends, beginning on September 7.

The course will start on Friday nights at 7:00 pm and end on Sundays at 5:00 pm. Training will include classroom theory and practical sessions (pool and open water work.) The class will be limited to the first 30 people who register.

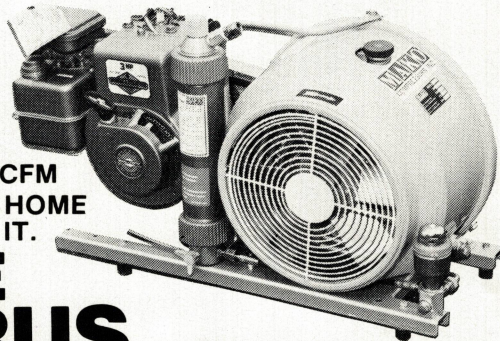
For information, contact: Dr. Thomas Doubt, Dept. of Physiology, State Univ. of New York, Buffalo, NY 14214. »

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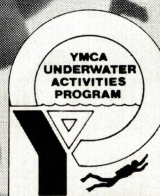
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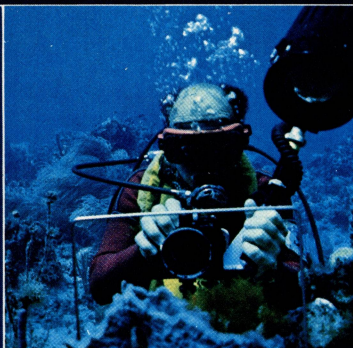
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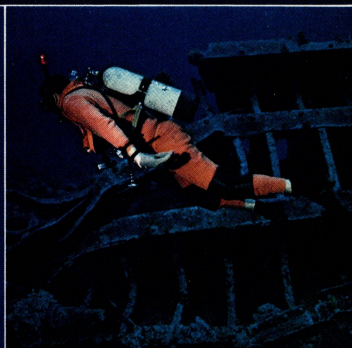
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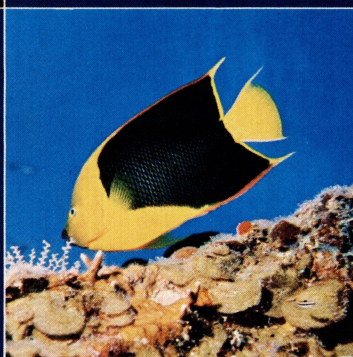


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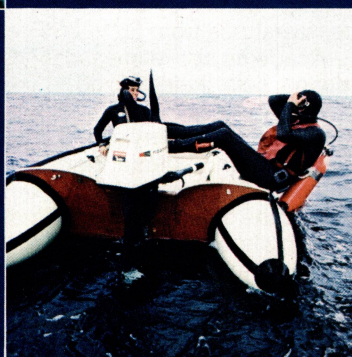
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THE CAYMAN DIVER

A GLORIOUS WEEK AT SEA
OFF GRAND CAYMAN

BY NANCY FERGUSON

A week aboard the *Cayman Diver* can be an unsurpassed dive vacation — especially if the company is good and the weather smiles.

Living aboard a boat, with almost constant access to the glorious walls and reefs of Grand Cayman Island is a delightful improvement over waiting each morning for transportation to sea. The diving is limited only by rules of safety; within those limits one can dive at almost any time of day or night.

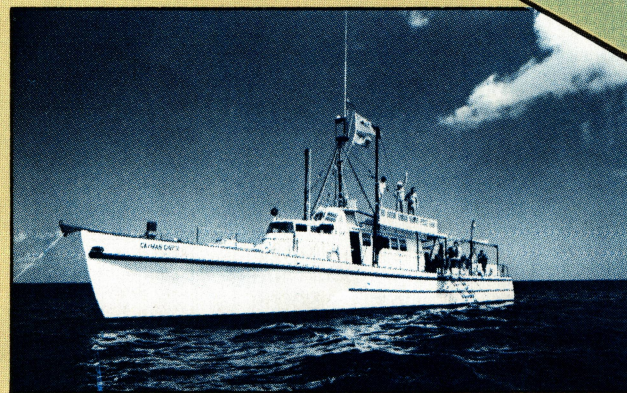
Recently, 11 passengers, most of them strangers, met in the Miami Airport, flew together over the sparkling waters of the Caribbean, and settled themselves aboard Paul Humann's *Cayman Diver* for seven days of magnificent underwater scenery, fabulous food, and frequent, unrestrained laughter. There were also sunburns, sheets of rain, itchy encounters with sea creatures, frustrations over flooded photo equipment, and stubborn fish who refused to pose for that one "perfect" shot.

The *Cayman Diver* is admirably organized to afford convenience either to the novice or the experienced underwater explorer. There is room for everyone plus paraphernalia and always an outstretched helping hand. Thus, it happened that by the first breakfast, the 11 guests quickly welded into a united group to complement the quiet but congenial crew.

The walls of Grand Cayman, where bottomless canyons drop off from U/W mountain tops 65 feet down, are festooned with black coral and gorgonians. Sponges, red as fire engines and almost as large, live in urban profusion. There is so much to see that the divers hang suspended, sometimes not knowing where to aim their cameras first in order to capture the riches surrounding them.

On the "flats" — the tops of these U/W mountains — color is so varied and vivid that mere words fail to evoke adequate images. Sapphire blue chromis, amethyst and topaz fairy basslets, emerald and turquoise blueheads all dart swiftly by. Shy, flashy red striped squirrelfish gaze soulfully from huge black eyes as they hang close to their rocky homes. Sunflower yellow butterflyfish and their striped or four-eyed cousins chase each other around stately blue and gold Queen angels. Schools of grunts, goatfish, and tang populate the area. And, in a cove just over the edge, a nurse shark sleeps peacefully, as oblivious as a bear in hibernation.

In a shallower area, flippered feet protrude from a cloud of prison-striped sergeant majors, gathered for a feast of bread



Living aboard a luxury dive boat for seven days can be a diver's dream come true. The *Cayman Diver*, booked by See & Sea travel agency, provides constant access to the walls and reefs of Grand Cayman.

the diver had brought below. His buddy busily snaps the scene, trying, almost in vain, to see the human head and body connected to the legs. Finally, the bread consumed, the diver appears, delighted eyes flashing behind his mask, as the fish disperses to search for another handout.

Tiny tube-dwelling creatures unfurl like multi-hued holiday flags. Others creep over lacy purple seafans like walking piles of confetti. Crinoids curl their spiny arms. And, of course, when the photographer has fitted his camera with a macro lens for close-up work, eagle rays soar majestically overhead. As he climbs back on board he emits suicidal groans over the lost opportunity.

The days glide by too quickly. The sun beats down, sending skin divers into the water to cool off. Giant parrotfish peck at the coral heads under the boat. A lost remora desultorily cleans the bottom of the hull. At night, lightning performs on the horizon until it tires and lets the stars take over, and phosphorescent flying fish skim by like phantoms.

It's over: a short span of time that has added a dimension of beauty to the lives of those privileged to enjoy it. With thanks to the skipper who knew where to go, wistful good-byes to those who made the topside hours pure fun, and fervent prayers to the powers that be to keep it unspoiled for those who follow after — or come again. 🐟

Divers Directory



Advertising rate is \$70 for three consecutive ads, \$120 for six consecutive ads, \$185 for a full year. **PAYMENT MUST ACCOMPANY COPY.** Send all material to Diver's Directory, c/o Skin Diver, 8490 Sunset Boulevard, Los Angeles, California 90069.

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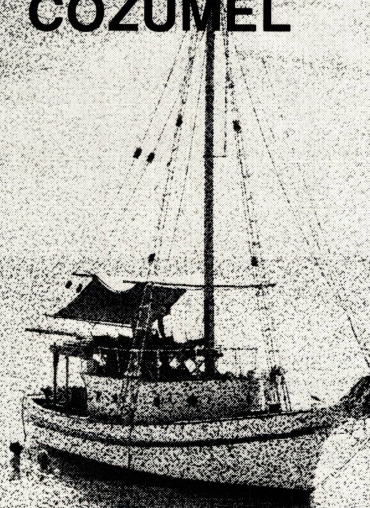
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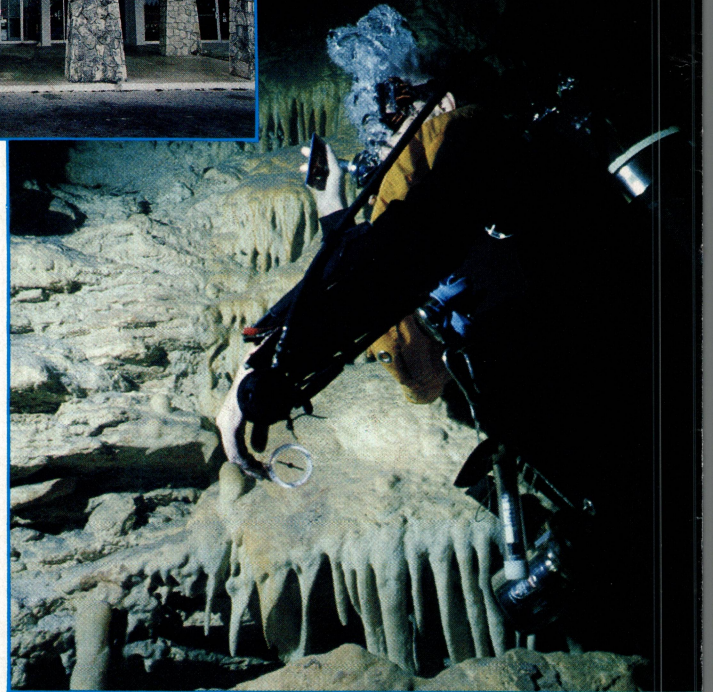
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UNDERWATER EXPLORERS SOCIETY



Freeport, Grand Bahama. For thousands of tourists the name immediately brings to mind dreamy thoughts of sun, blue water and relaxation. But for the diver and the potential diver, Freeport can mean a whole lot more. It is the home of the Underwater Explorers Society, a combination dive resort, country club and scuba instruction school all rolled up into one.

The Underwater Explorers Society (UNEXSO) is one of the most modern dive resorts in the world, catering to a variety of visitors from the most experienced diver to the basic student. With over one-half dozen instruction programs ranging from basic scuba certification to advanced diver training, there is something for everyone at UNEXSO.

The facilities at the UNEXSO Club are impressive. With emphasis on instruction, the dive center has an 18 foot deep freshwater training tank equipped with seven observation windows. There is also a large shallow water swimming pool for beginning scuba instruction. Lectures are held in an air-conditioned classroom and combination sea library complete with audio-visual equipment. A four-man recompression chamber allows the club to extend its programs to special dive medical courses, decompression diving instruction and NAUI Instructor Training Courses. The recently renovated photo lab now handles E-6 color film processing, black and white film processing and printing. Classes in underwater photography are under way. In addition to all this, there are saunas, an exercise room, compressor room, dive museum exhibit, overnight equipment storage lockers and a new diver's lounge on the second floor.

UNEXSO's dive trips are as diversified and flexible as its extensive instruction programs. Freeport diving offers shallow coral gardens, medium depth coral reefs, deep wall dives, wrecks, coral caves and canyons, ocean blue holes and even inland freshwater blue holes. The fleet of dive boats departs from the club's private dock at different times of the day to a variety of locations. The dive trips are scheduled in advance and posted on a big bulletin board in the UNEXSO's dive shop and planning center. Divers can easily select a dive by reading the information posted and signing up for the trip that suits them best. This system has proved to be quite successful: a diver can combine several different dives in the same day. Most of the reefs are only 10 to 15 minutes away from the dock and because they are single tank dives, there is plenty of time to get in for the next trip.

UNEXSO is owned and managed by John Englander, a professional diving instructor (NAUI) of 11 years. John moved to Freeport in 1972 and took over management of the club in 1974. John is very actively involved in teaching. In 1977 he was presented with NAUI's "Outstanding Contribution to Diving" award. The dive supervisor is Jack Brackett, a highly experienced NAUI instructor who has worked at several other dive resorts in the Bahamas. The club has a staff of nine NAUI instructors, the largest number of certified instructors of any resort in the Caribbean. Because of the large staff the club is able to offer many different certification courses and a wide selection of reef trips. Jack Brackett coordinates all the activities with great efficiency and the organization runs smoothly.

Freeport is the ideal spot for the diver who wants some exciting night life and/or is traveling with a non-diver companion. Known as the "Riviera of the Bahamas," Freeport is a modern resort town with a wide selection of plush hotels, fancy restaurants, casinos, nightclubs and discotheques. For bargain shoppers there is the 10 acre International Bazaar, which over the years made the term "freeport" shopping so famous. If you enjoy golf or tennis, Freeport/Lucaya has five championship golf courses and tennis next door to UNEXSO.

And, if your non-diving spouse or friend wants to try the sport of scuba, there is no better place than the warm, crystal clear, blue waters of the Bahamas. Unlike most dive resorts which cater mainly to experienced divers, at UNEXSO you have the best of both worlds: There is something for everyone. There is a choice of reef trips for any skill level and instruction for the beginner or advanced diver. For those with no experience, a highly qualified instructor can take you from the

shallow pool, to the training tank and then to a shallow reef in just a few days.

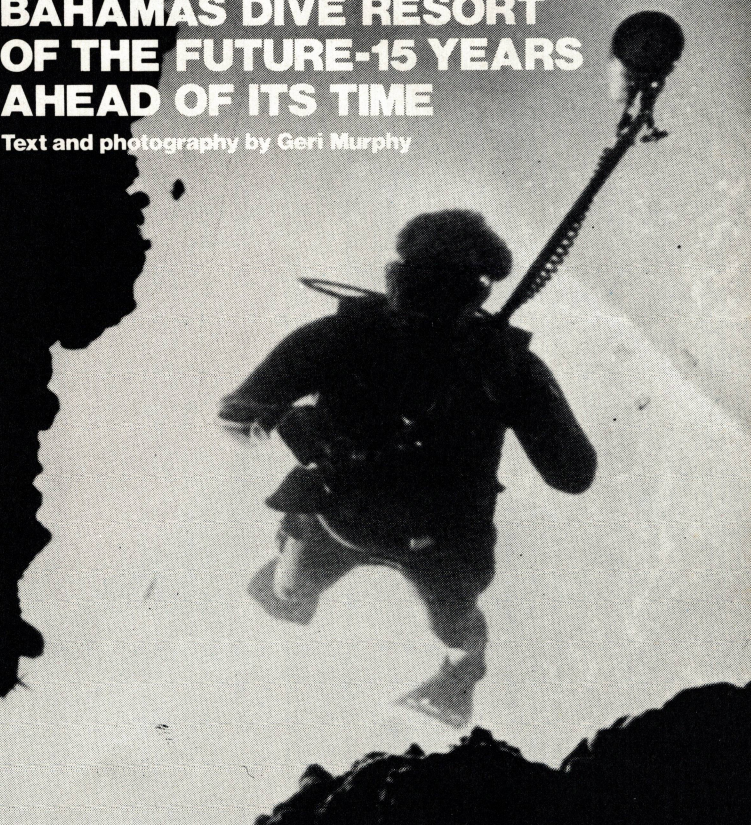
The Underwater Explorers Society serves close to 4000 divers annually, 2500 of which are novices who enroll in resort instruction programs. The club caters to a wide spectrum of visitors including individuals, couples, groups, families and large groups. Medical diving seminars are conducted in April, August and November. The club is located right on the water at the Bell Channel Bay, across from the marina. It is six miles from the airport and next door to the Lucayan Bay Hotel.

The Underwater Explorers Society offers many dive packages. In keeping with its policy of choices and flexibility, the packages can be arranged for a number of different hotels, nights and type of accommodations. It is easy to get to Freeport. Eastern Airlines flies several times daily nonstop from Miami and New York. Delta flies from New York and Bahamasair from Miami and Ft. Lauderdale. For more information, brochures and prices for diving with the Underwater Explorers Society, write: U/W Explorers Society, Box F-2433, Freeport/Lucaya, Bahamas. For reservations and information call: (800) 327-0787. Florida residents call: (800)-432-5599. Miami residents call: 443-3821.

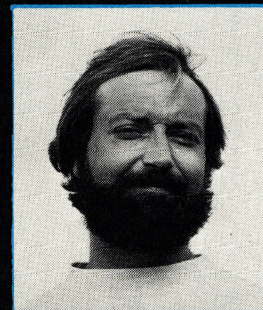
Although UNEXSO was designed and built 15 years ago, its concept and facilities are more modern and extensive than most resort facilities in existence today. UNEXSO points the way toward dive resorts of the future.

BAHAMAS DIVE RESORT OF THE FUTURE-15 YEARS AHEAD OF ITS TIME

Text and photography by Geri Murphy



John Englander



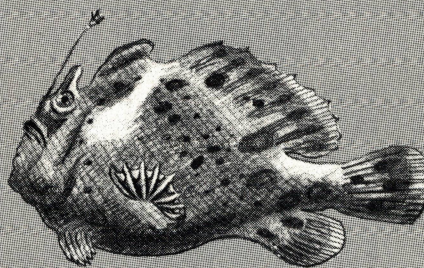
Jack Brackett



The Longlure Frogfish

(*Antennarius multiocellatus*)

Frogfishes are grotesque, lumpy creatures that don't look like fishes at all. They hardly ever swim, but instead sit on the bottom well within the protection of the cracks and crevices of a reef, blending almost totally into their surroundings. They use this camouflaging ability to their best advantage. Other fishes will swim dangerously close to the frogfish without detecting its presence. Then, the frogfish extends its fishing lure — a long antenna or illicium that appears to be baited with some tasty, worm-like thing — and wiggles it about. The unwary fish sees the lure and comes in to take the bait. In one gulp, the frogfish swallows the unsuspecting fish. □ Frogfishes are scientifically classed as Antennariidae, a word which comes from the Latin for "antenna," in reference to the fishing lure. They get their common name for the fact that they resemble warty, bumpy frogs. *Multiocellatus* comes from Latin words which mean "many eye-like spots." In our pictured specimen, these spots are slightly visible on the dorsal fins and on the body. The coloration of *A. multiocellatus* is extremely variable, and the spots can be very pronounced or hardly noticeable. It is believed that the fish can change colors to match its surroundings, or when it is excited or disturbed. The common color phase is a light, drab yellow, but the fish can be bright yellow or orange. Then, it can be entirely black, which some ichthyologists describe as a "disturbed phase." Bohlke and Chaplin write that when in this black phase, the sitting frogfish resembles a small loggerhead sponge. □ The common name for *A. multiocellatus* is longlure frogfish, a direct reference to its elongated fishing lure (not discernible in our pho-



tograph). This lure is much longer than those of the other Bahamian frogfish species. *A. tenebrosus*, the flagpole frogfish, has a similar long lure, but the two species are distinguishable by their individual colorations and markings. The longlure frogfish always has pale dorsal markings and a pale spot that extends down onto the body before the first dorsal spine. □ The longlure frogfish is the most common species of the family in the West Indies. It has been recorded from both sides of the Atlantic, from Bermuda, the Bahamas and Florida, south through the lesser Antilles, including the

Central American coast. It lives in shallow waters and many of them are found in less than 20 feet. Randall notes that many times the fish is blown ashore during storms. It is not a big fish, growing only to about four and one-half inches maximum. Its usual habit is to stay in one place, "fishing," but often it will travel slowly

along the bottom like a lumbering mollusk, its thickened dorsal spines reaching from side to side as it moves. The frogfish is a voracious eater and feeds primarily on fishes, with some crustaceans thrown in. Randall noted that the diet of the *A. multiocellatus* specimens he collected from the West Indies was 75 percent fishes (*Haemulon carbonarium* — the Caesar grunt), the other 25 percent consisting of crabs and stomatopods. Frogfishes can swallow fishes that are considerably bigger than themselves: Randall took a 102mm grunt from the stomach of a 97mm *A. multiocellatus* individual, and a 89mm squirrelfish was removed from another frogfish that measured 70mm. Such statistics go far in illustrating the voracious appetite of these "fishing fishes." »

Photo By Carl Roessler - Text By Hillary Hauser

The photo was taken in 20 feet of water on the wreck of the *Balboa* off Grand Cayman. Roessler used a Nikon F in a Nikomar housing with a 55mm lens and a Bauer E252 strobe. F16, 18 inches from subject.

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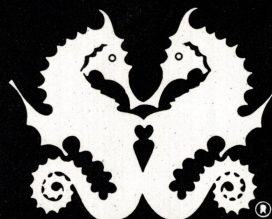
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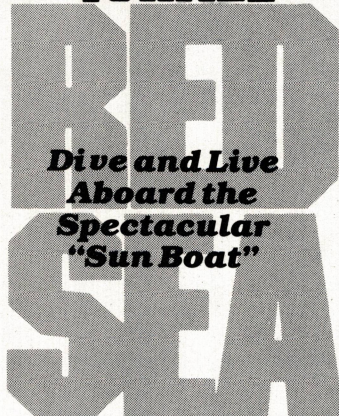
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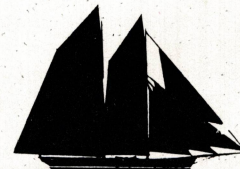
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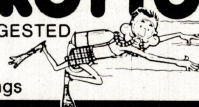
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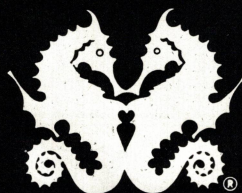
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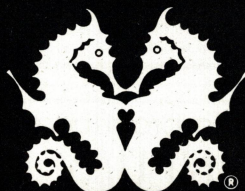
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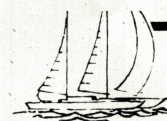


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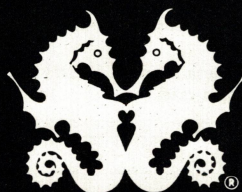
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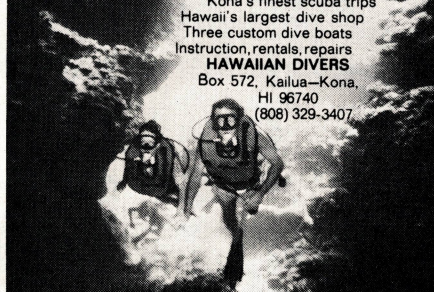
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An underwater photograph showing several divers exploring a sunken structure, possibly a shipwreck, in clear blue water. Numerous fish are visible swimming around the divers. The scene is illuminated by sunlight filtering down from the surface.

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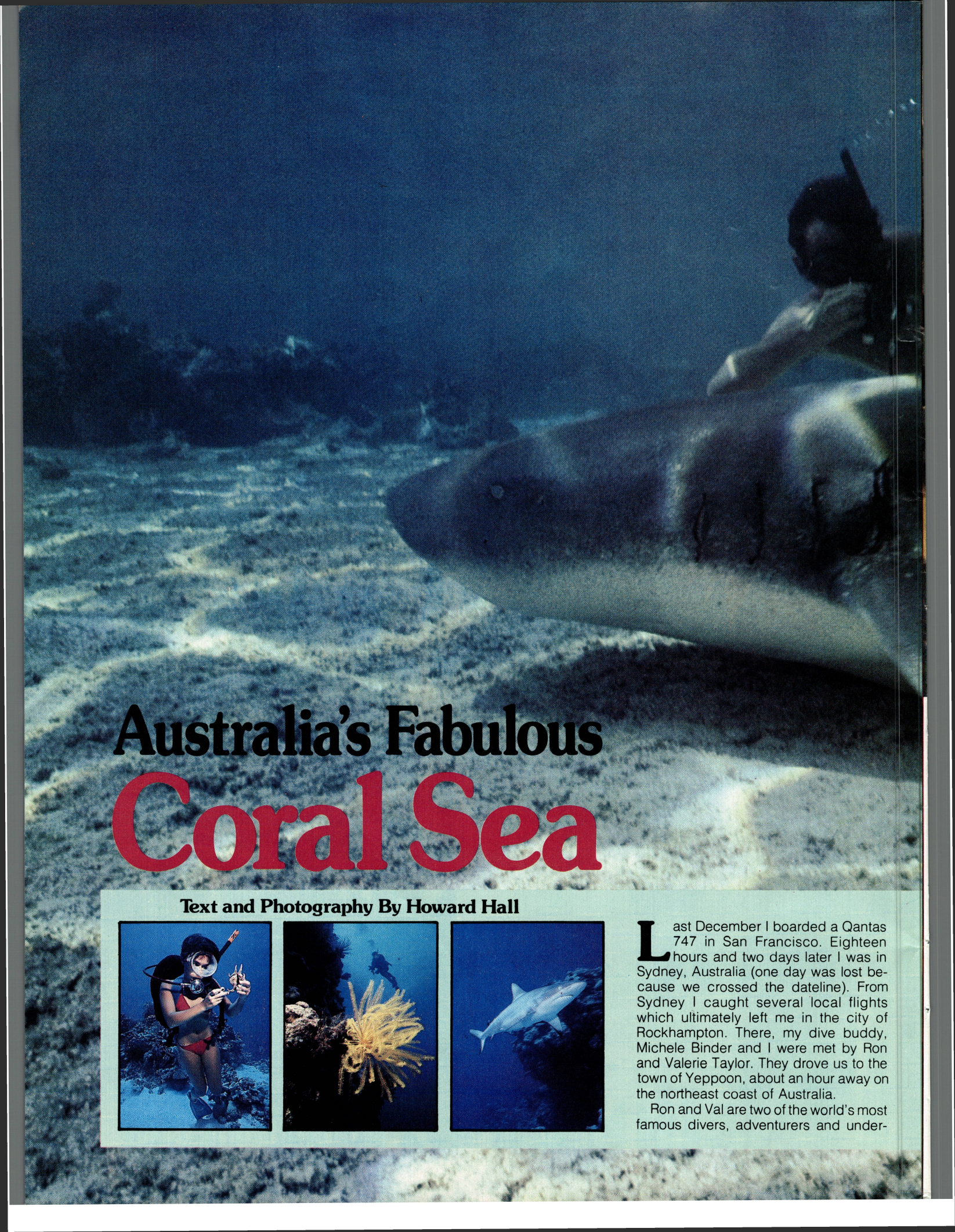
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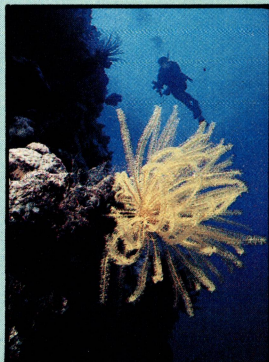
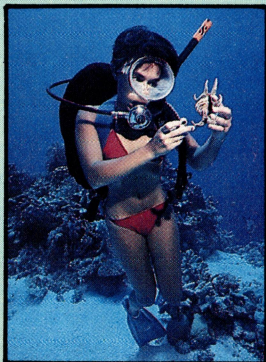


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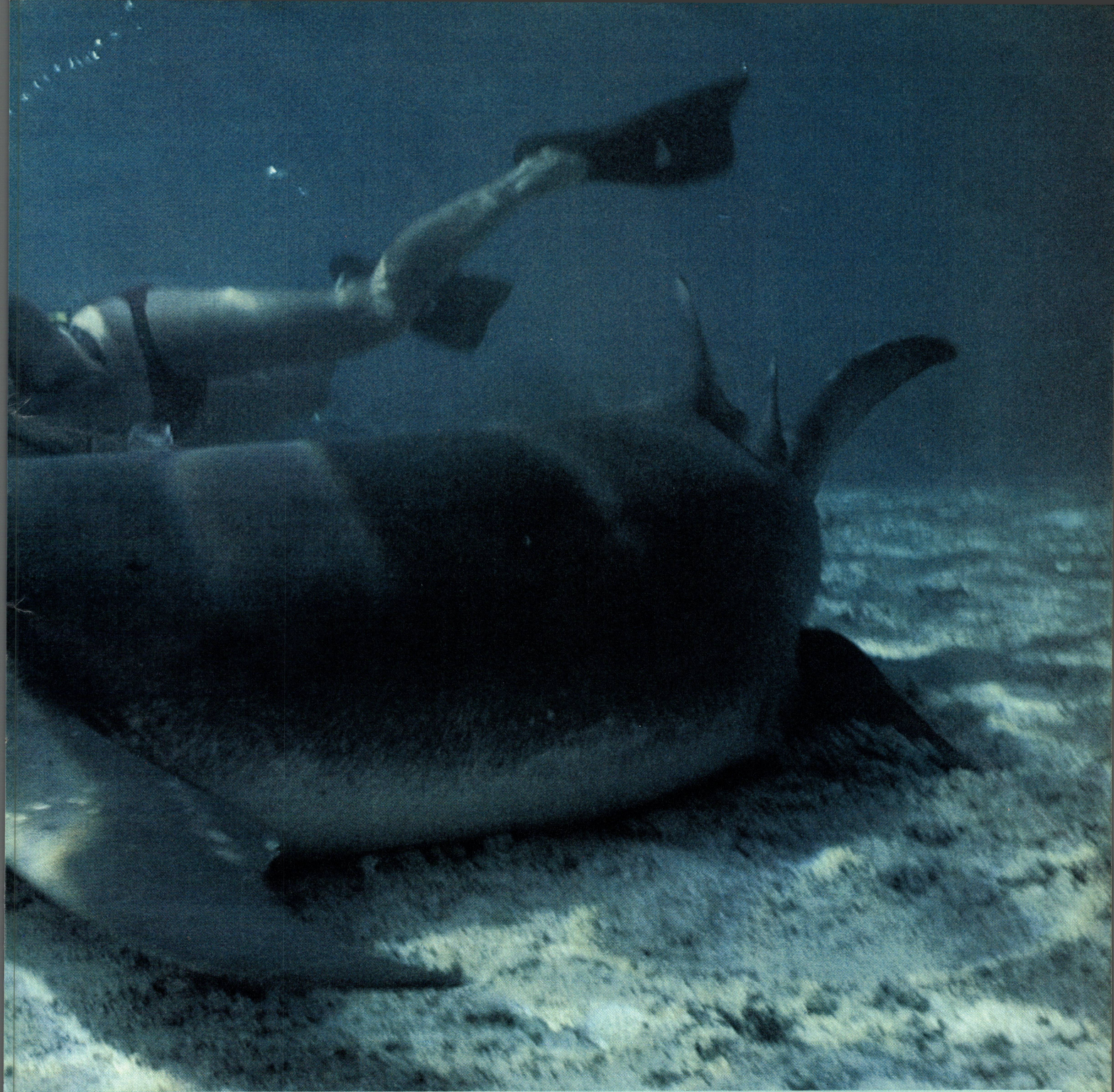
Australia's Fabulous Coral Sea

Text and Photography By Howard Hall



Last December I boarded a Qantas 747 in San Francisco. Eighteen hours and two days later I was in Sydney, Australia (one day was lost because we crossed the dateline). From Sydney I caught several local flights which ultimately left me in the city of Rockhampton. There, my dive buddy, Michele Binder and I were met by Ron and Valerie Taylor. They drove us to the town of Yeppoon, about an hour away on the northeast coast of Australia.

Ron and Val are two of the world's most famous divers, adventurers and under-



water photographers. They are very unusual people for many reasons. They are wonderful people, have many exciting stories to tell, and are great fun to dive with if you have a strong heart.

A typical Christmas holiday (one month long) for the Taylors is spent diving the incredible reefs of the Coral Sea. To make this year's holiday as comfortable as possible they chartered the 85 foot, *Coralita*, which is owned and operated by Wally Muller. The *Coralita* is comfortable, the food is unbelievable, and Wally Muller is one of the world's most ex-

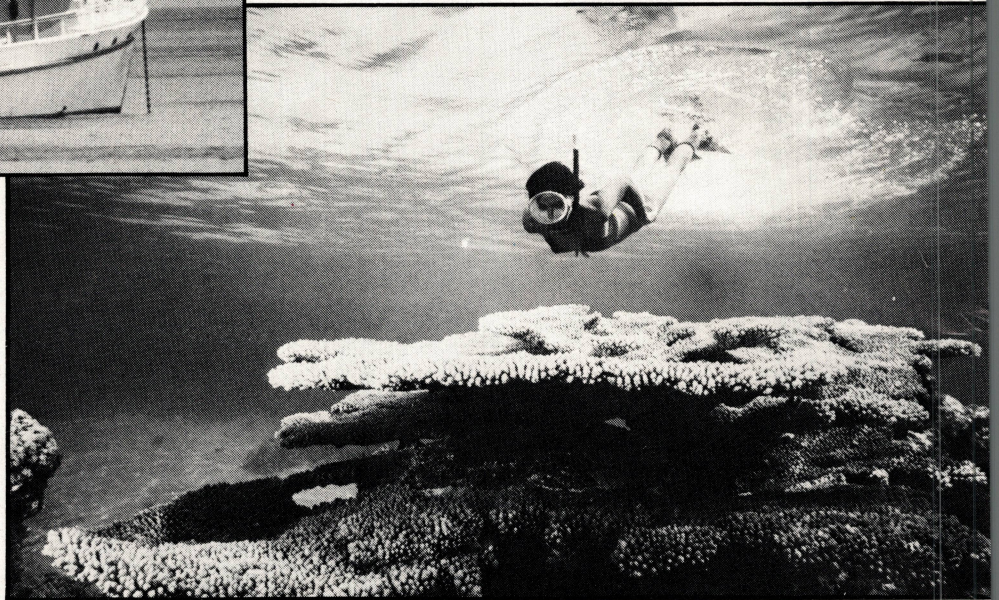
perienced navigators of the Coral Sea.

Certainly the crystal clear waters of the Coral Sea are a bit out of the way for American divers. But, the trip is worth the trouble. There is an excitement, an awesomeness and day-to-day adrenalin rushes that beckon the diving adventurer. There is the realization that it is commonplace for creatures the size of divers to attack and eat each other on these reefs. After you get used to the idea, it can be quite splendid to have a sea snake swim through your hair or to see one or more sharks every time you

turn around. Every time!

I'm not trying to imply that there is a substantial percentage of divers who don't return from diving vacations to the Coral Sea. This is simply untrue. Sea snakes won't bite you unless you bite them first, and you have little to fear from the sharks unless you soak your swim trunks in fish oil before you dive, or spear fish. These dangerous creatures have spent thousands of years developing a preference for dinner. Sharks like to eat fish. Sea snakes find divers far too large to swallow. So if you do not molest these

Coral Sea



animals, they will simply regard you as a curiosity. But knowing that your life is not in danger does not ruin your fun. The Coral Sea is still a very exciting place.

One of the first places the *Coralita* stopped was Marian Reef. I spent my first couple of dives attempting to photograph the magnificently colored reef fishes that filled the water there. I was amazed to discover that these fishes knew as much about photography as I did. Somehow, without the benefit of classes or textbooks, those fish knew everything about my lenses and about composition. They knew how to be too far away for my lens, too fast for my focusing abilities, and too hidden. They greatly enjoyed watching me bite through my regulator mouthpiece in frustration. Valerie finally gave me some good advice.

"Take some bacon fat down as a lure," she said. "They love bacon fat and they will cooperate nicely for you if you just rub some on the coral for them."

So, I gathered some leftover bacon fat, put it in the pocket of my wetsuit and went off to photograph the fish again. It worked. The fish were very interested in the bacon grease and they posed very well for my camera when I gave them some. But, bacon grease is not soluble in water and stuck to my hands and my wetsuit. It felt horrible and there was absolutely no way to get it off my suit, which still smells like a Denny's No. 1.

Valerie, however, doesn't use bacon fat. She takes a small bit of fish with her to use as bait. I did the same the next day, had far better luck, and the smell and mess weren't half as bad. In fact, on the next dive I had really great luck. The bottom was flat and covered with brilliant white coral sand. There was an occasional coral outcropping that rose from the bottom at 40 feet to near the surface. I swam to one of these outcroppings, stopped, took out some of my fish and rubbed it on the coral. Soon I had many colorful fishes and even a small reef shark cooperating for my camera. It was all very pleasant. But then, out of the corner of my eye, I saw a large stainless steel, two-man submarine hanging right behind me.

"Submarine?" I thought, turning to get a better look. "Where would a submarine come from way out here?"

But, then I realized that the object hanging three feet away from me was no submarine. It had an eye. And great sharp spikes for teeth. It was the largest barracuda I had ever seen. It is difficult to estimate the size of such an animal underwater, especially when your gaze is fixed on the mouth. However, I'm six feet tall and it was longer than I was. People often ask me what I do when I see a shark or a killer whale or something like a seven foot long barracuda. I always tell them to do the only practical thing: Take its picture. So, I took the barracuda's photograph. But, not before I took the bait fish out of my pocket and dropped it.

Visibility in the Coral Sea was the best I had ever experienced. At times I could see 300 feet horizontally. When the water is that clear, you dive differently than you might when visibility is only 40 or 50 feet. There were many occasions when I would take two cameras down with me on a dive, set one down, swim off with the other and look around for the first camera later. Also, it was totally unnecessary to take a compass with me. When I wanted to go back to the boat, I just looked up for it and swam back.

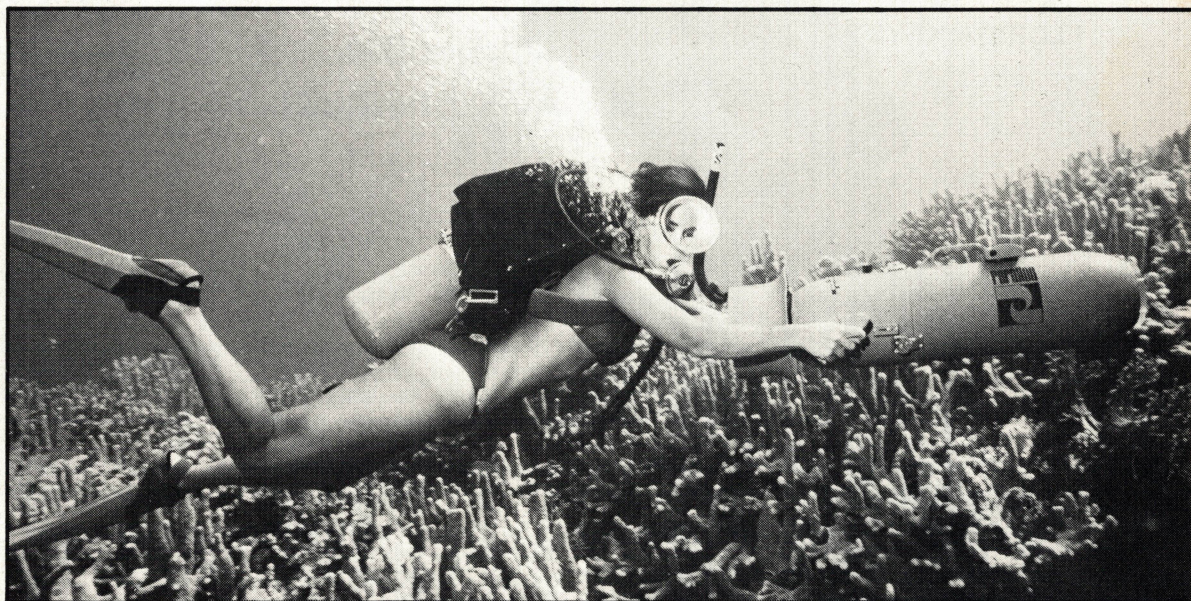
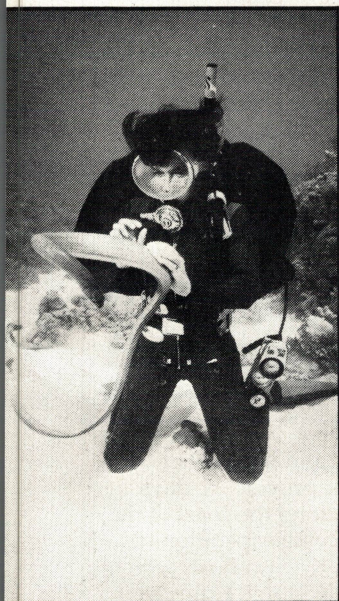
Michele is a great dive buddy and underwater photographer's model. When I ask her to swim over a large seafan she does it gracefully for the camera. When I ask her to pose next to an anemone, she will stay put and happily stare at the thing

for as long as it takes for me to get what I want with my camera, and sometimes that can be a long time. But she says she never gets bored and I take advantage of her willingness every chance I get.

One morning, on Marian Reef, I handed Michele a sea snake. Sea snakes are all over Marian and several other reefs in the Coral Sea. There are several species (I counted five) and they all have one thing in common. They are all very deadly.

Two years ago, while diving Marian Reef with the film crew of *THE DEEP*, I had plenty of time to experiment with sea snakes. Most of our dives were deep and I found myself spending long hours on top of the reefs decompressing and looking for interesting ways to pass the time. The most common sea snake around was the olive sea snake and I soon found that if I touched its tail it would not turn, strike, and kill me. After much experimentation, I found that if I grasped the snake very gently it would seldom become upset, begin to struggle or bite.

Before I gave Michele the snake, I told her what I had learned. She must hold the snake very gently and if it began to struggle in the least, then she must release it immediately. Later, I found a snake resting in the sand, asked Michele to kneel next to it, and then reached down to gently lift it and pass it to her. The snake seemed not at all bothered by Michele's gentle grasp and she held the animal for more than a minute before she realized what she was doing and let it go.



Michele and I never handled any other species of sea snake because they all seemed more nervous than the olive. But it was very obvious that these creatures were perfectly safe to be around as long as you didn't provoke them. They are not like rattlesnakes that might leap out from behind a rock to bite you. If you leave sea snakes alone, they will leave you alone. But though the sea snakes we encountered were non-aggressive, I'm sure handling them is not a good idea.

As I mentioned before, sharks are a common item on the reefs of the Coral Sea. No matter where you are diving, there is nearly always one shark in sight and often many. Two of the common species are considered quite dangerous: the gray reef shark and the silver tip reef shark. These impressive creatures generally keep their distance. Occasionally they would swim past us eight or ten feet away, but it was obvious that we were not being considered for a meal and we soon learned to accept them as another part of the reef community. For most of us, observing and photographing these sharks in this manner was most sufficient. But for Ron and Valerie Taylor and for their assistant, Soames, this was not enough.

The Taylors' trademark as filmmakers is exciting underwater action and generally this means sharks. While most of us were diving near the *Coralita* photographing reef fishes, the Taylors and Soames were off in a skiff a mile or so away baiting sharks. Once or twice they invited me along (a dubious privilege).

The Taylors would take their skiff a mile or so down the reef, swim down with their movie cameras, disperse 20 or 30 pounds of shark bait, and then take shelter in the coral to wait for the sharks to go crazy. This would not take long and the crevices that I found myself backing into were never deep enough. But for the Taylors, having sharks thrashing around their cameras is just another day's work.

Although Ron, Valerie, and Soames did manage to retain their limbs during the trip, there was one minor injury. While Ron was filming a shark frenzy one morning, a large shark burst out of the crowd and crashed into the front of his camera. The impact smashed the filter on the housing's port and drove the camera back into Ron's face, leaving a deep cut on his forehead. It happened so fast that Ron couldn't identify the species of shark that had hit him, but he was very glad it had occurred — now he has it on film.

During the weeks we spent in the Coral Sea, Wally Muller guided the *Coralita* to several different reefs. Some of these were less than a mile in diameter and some were many miles in length. There was generally no land in sight with the exception of an occasional coral island. Diamond Island was one of the largest of these. It is about a mile long, 100 yards wide and mostly sand with a few bushes and thousands and thousands of birds. We spent one day snorkeling in its shallow waters, watching turtles mating and finding a number of 10 to 12 foot nurse sharks in about eight feet of water.

The most incredible drop-offs were at More Reef. Valerie told me that it was named More Reef because it has more of everything that makes the Coral Sea exciting. The water there was deep dark blue and crystal clear. When Michele and I dropped into the water the first thing we noticed was the sharks. They were everywhere. Within visibility we could count at least ten at any one time. And swimming with the sharks were tuna — large, 100 to 150 pound tuna which were nearly as large as the sharks. As Michele and I swam toward the edge of the drop-off, we passed through huge schools of magnificently colored reef fishes. Then we reached the edge and looked over the side. What immediately caught our eyes were the enormous soft corals and seafans. They were huge. We dropped down to 120 feet to the first of the gorgonians we saw. When Michele knelt beside it I realized that it was over 12 feet high. More Reef was the most.

The beautiful and exciting reefs of the Coral Sea have never been easy to get to even for Australian divers. The *Coralita* has been just about the only boat to venture into those waters for many years. But the Coral Sea will soon become a far more attractive option for the American diver. Several new boats are being constructed and Wally Muller is planning a new 100 foot long vessel. But most attractive of all, are Qantas Airlines' new rates: about \$450 from San Francisco to Sydney. The remote reefs of the Coral Sea suddenly seem not so far away. »



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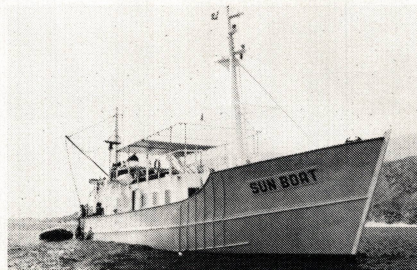
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RED SEA SEAFARIS

La Mer Diving Seafaris has expanded its schedule to the Red Sea. Every two weeks, starting August 19, 1979, a cruise/diving seafari will commence. There will also be an overland



explorer seafari that leaves the first weeks of October and November.

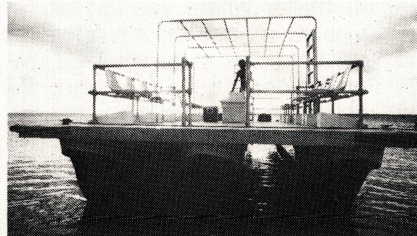
La Mer Seafaris provide 11 days of unlimited diving along the coast of the Red Sea. Cruise/diving expeditions use La Mer's 96 foot "K" Sun Boat, which offers the latest electronic equipment, six double-occupancy, air-conditioned staterooms, three meals a day, and supplies divers with all equipment.

The overland seafaris use air-conditioned, four-wheel drive minibuses and even camels as they travel along 100 miles of Red Sea coast. Every seafari ends with a two day guided tour of Jerusalem.

For information, contact: La Mer Diving Seafaris, 823 U.N. Plaza, Suite 810, New York City, NY 10017.

DIVE BONAIRE EXPANDS

Peter and Alice Hughes, owner/operators of Dive Bonaire, in the Netherlands Antilles, have announced the



addition of a third 26 foot Bristol Blue Water Flattop trimaran to their fleet of dive boats. The new vessel gives Dive Bonaire the largest dive boat fleet operating in the Dutch Caribbean.

Dive Bonaire has also increased its tank rental capacity from 40 to 80 tanks and added a third compressor.

For further information, contact: Dive Bonaire, PO Box 686, Ithaca, New York 14850.

NEVIOT DIVING CENTER

Neviot Diving Center, Israel, has recently opened its new store. The first

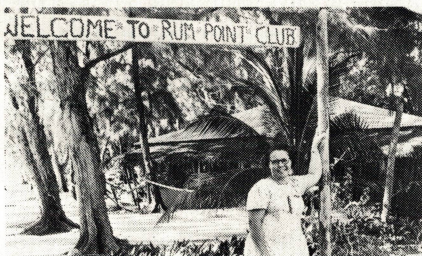
PADI Training facility in Israel, Neviot Diving Center is adjacent to the Neviot Holiday Village complex, only minutes from Red Sea reef dives.

Neviot offers year-round diving instruction at all levels, with both CMAS and PADI certification. In addition, two diving seafaris are organized each month with week long dive trips to the world famous reef of Ras-Abu-Galum and Ras Muhammed.

For further details, contact: Martin J. Sutton, Neviot Diving Center, Post Eilat, Israel. ✉

SMITH MANAGES RUM POINT CLUB

Phillis Smith has been named manager of the Rum Point Club, a 10 unit resort located on Grand Cayman's north shore. Having been associated with the club for the past 13 years in various capacities including assistant

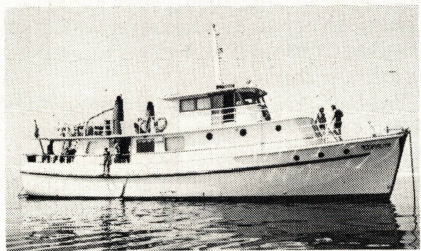


manager and chef, she is the second Caymanian ever to be named a hotel manager in the three-island British Crown Colony. She will supervise a staff of eight and be responsible for daily operation of the club.

The Rum Point Club is known for its charming thatched-roof "native" atmosphere, private pine-shaded beach, and its proximity to favorite dive spots such as the famed North Wall. ✉

SEE & SEA TO CORAL SEA

See & Sea Travel, Inc. of San Francisco has announced its eighth season of dive trips to the remote reefs of Australia's Coral Sea. These reefs,



which are seldom seen by divers, offer some of the world's most dramatic and virgin diving. See & Sea pioneered the region in 1972, and has hosted groups every year since that first adventure.

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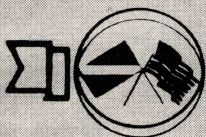
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Wisconsin's Legendary Lake Geneva

BY ALAN ROWE

Sunken treasures in the Midwest? Maybe not gold doubloons and pieces of eight, but there are relics of the past that lure this region's divers. In the shadows of vintage gazebos, Victorian-style hotels, and once-posh resorts lie the reflections of history. Artifacts from a bygone age of elegance are scattered on the bottom of Wisconsin's legendary Lake Geneva.

Lake Geneva is located in the beautiful, hilly, southeast corner of Wisconsin. Three cities are found along its 26 mile shoreline. Fontana, Williams Bay, and the City of Lake Geneva are each nestled in bays at opposite ends of the lake. They began as Indian villages and grew as the white man began his settlements. The history of the lake is unique. Several phases of the last 200 years have produced a wide variety of artifacts. There are enough relics to fill the goody bag of any diver — who's done a little research.

Beautiful ornate sidewheelers also once traveled Lake Geneva, carrying passengers, mail and cargo to each of the cities. Names of well remembered steamers include: the *Atlanta*, *Arrow*, *Lady of The Lake*, *Commodore*, and the *Lucius Newberry*. Many of these now reside on the bottom of Lake Geneva.

One legend that draws the attention of divers is that of the *Lucius Newberry*. Reportedly, on the night of December 19, 1891, she ended her last excursion in a fiery death. One of the lake's more exquisite vessels, she was complete with a luxurious decor that included crystal, brass and polished fixtures, and even oil paintings. The most valued object aboard the *Newberry* was the ship's bell, supposedly taken from a cathedral in the 1848 Mexican War. Theories vary as to whether it was cast of silver or bronze. But most agree it is worth a fortune.

The *Lucius Newberry* caught fire while tied up to the minicipal dock and was cut loose in order to save the other wooden steamers. With a ghostly ringing, the sidewheeler drifted out on the lake and followed her original excursion route. When the flames reached the waterline, she sank. Somewhere on the bottom, along those last torturous miles, lies the Mexican bell.

Antique bottles, chinaware, crystal pieces, and silver table items also rest on the bottom. During the weekends of the dive season, you can find divers flags bobbing on the waters of bays and in front of obscure ruins. Who knows what underwater secrets are being excavated. A small pile of Civil War am-



photography by Chris Boche

munition canisters was exposed on my last visit.

Boat landings carry their own legends. Both old and new ones dot the shoreline. Nearby, rotting remains of wooden pilings indicate the once busy mooring stations of private steamers and yachts. At one such site, we found the telltale signs of extravagant lifestyles, along with a ship's galley stove. An ornate cast iron framework held twin globes still filled with kerosene!

The lake area is saturated with stories handed down through generations. Some of these tales can lead the interested diver to successful recoveries. Lake Geneva's local library has volumes of history about the lake. Their files include family documents, old photographs, and books that can result in an U/W trip into the past.

The Geneva tourism office sells charts and maps that indicate depths as well as all of the bottom conditions that

you may find. Booklets also supply brief historical highlights.

Access to the water is found in each of the three cities. Launch ramps are public and boat rental agencies handle a variety of boats. Big Foot state park, located at the east end of the lake, is a great place for dive clubs to set up camp and stay close to the water.

The depths of Lake Geneva range from 10 to 140 feet. The best diving clarity I found was on a plateau that goes around the lake at about 30 to 40 feet. This plateau also has the greatest concentration of relics. From 30 feet an incline descends to deeper water. Visibility remains fair to about 80 feet, where many more interesting artifacts have been found. The bottom varies from silt and sand, to weeds and gravel.

A metal probe rod is a handy aid in locating sunken glass or metal pieces. An underwater metal detector would

also be of value here. Any diver planning to dive in Lake Geneva should also check with the lake Safety Patrol. During the busy summer months, certain areas are restricted because of heavy boat traffic. The use of a divers flag is a requirement.

Lake Geneva is a memorable place to plan a weekend diving project. There is



Relics like these await the history minded diver who visits the legendary Lake Geneva. These were found in 30 feet of water off an old resort hotel.

so much to see and the lake is somewhat protected from severe weather by the hills that rise up around it. Should a storm kick up, there is always a safe harbor close by.

Once you enter this lake of romance, you may get caught up in its alluring past. Old tales will entice you to keep coming back and you will want to dive again into Lake Geneva's legends. >>>

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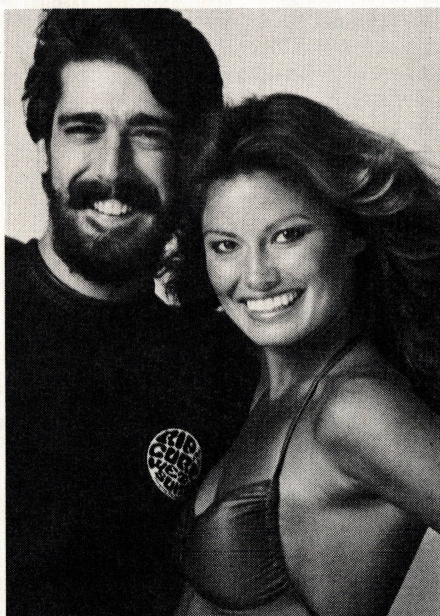
Number 1: 3 or 7 days unlimited diving/up to 3 single tank reef dives daily/FREE night dive/\$25 worth of dive equipment/air fills, back pack, weight belts. 4 Days/3 Nights, \$171.50 per person; 8 Days/7 Nights, \$293.50 per person (double occupancy).

Number 2: Learn to dive FREE/3-hour resort course/certified instructor/3 reef dive trips with instructor/all equipment FREE/FREE T-shirt. 4 Days/3 Nights, \$91.50 per person; 8 Days/7 Nights, \$153.50 per person (double occupancy).

Number 3: Basic certification course/credentials from National Association of Underwater Instructors/begins 9 a.m. first Monday of month/3 open water dives/FREE use of scuba equipment/\$50 worth of dive equipment. 8 Days/7 Nights, \$288.50 per person, double occupancy.

All Packages Include: Deluxe air-conditioned room at Lucayan Bay Hotel/FREE breakfast daily/FREE box lunch daily/FREE champagne/FREE airport transfers.

Here are our toll-free reservation numbers: U.S., 1-800-327-0787; Florida, 1-800-432-5594; Canada, 0-Zenith 99110; Miami, (305) 443-3821.



Please send me more information about CP Hotels' Great Vacation Packages in Freeport/Lucaya, Bahamas.

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Underwater Explorers Society Lucayan Bay Hotel

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THE FRESHWATER PEARL BY VESTA REA-SALISBURY

Lake diving, particularly in Tennessee, can be fun, fascinating and perhaps even profitable if you know where to go and what to look for. It is no unfounded brag that the Volunteer State has some of the clearest water around — with visibility extending up to 40 feet in the shale-bottomed lakes of Dale Hollow, Boone, Watauga, South Holston, and Center Hill Reservoirs. This clarity makes underwater spearfishing, Indian artifact collecting, and geode hunting very enjoyable. And it also allows the underwater sportsman the possibility of finding the beautiful, freshwater pearl.

The discovery of freshwater pearls dates back many centuries. When the Spaniards arrived in America, they found Indians using them for ornaments. Fascinated with the pearl's rich color and unusual shapes, many Conquistadors turned from seeking gold to bartering for the lustrous gems. Today on display across Europe and the Middle East are crown jewels, headdresses, robes, and caps adorned with the pearl from the freshwater mussel.

If all this has aroused your curiosity and you are heading for the nearest lake, I must warn you these pearls are not easy to find. A diver may discover only one pearl in 1000 mussels; then to his surprise, having moved a few feet from the original spot, he may retrieve five pearls in five mussels. It appears that the determining factor rests with the current — the more current, the better chance that the mollusks will contain a pearl.

The shells come in as many sizes and shapes as the treasure sometimes found inside. Freshwater mollusks are known by such unusual names as three-ridged, warty back, pistol grip, butterfly, maple leaf, sheep nose, monkey face, and slippery dick — to name a few!

Mussel shells are also an ideal material for implantation in oysters to form the nucleus for cultured pearls. The shells are sawed into strips and then into small blocks. After finishing and polishing, they emerge as round objects resembling pearls. Since the whole shell is exported to Japan, the implantation process is done over there. The only step that is performed in the U.S. is the actual collecting, shell sizing and internal cleaning, which is achieved through boiling.

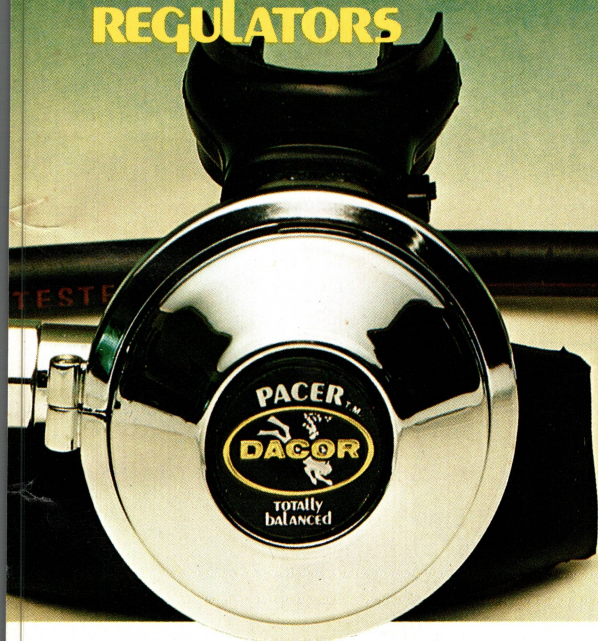
You may have to stalk the Tennessee mussel long and hard for that first freshwater gem, but whether you succeed or not, it will add a special excitement to your inland diving.

ALL NEW DACOR PACER™ *

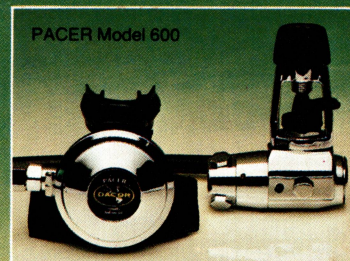
*Positive Air Controlled Equalizing Regulator™

PATENTS PENDING

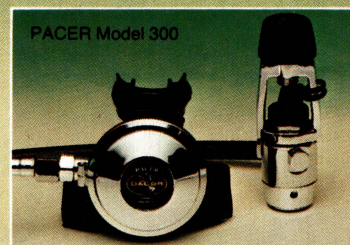
A WHOLE NEW GENERATION OF REGULATORS



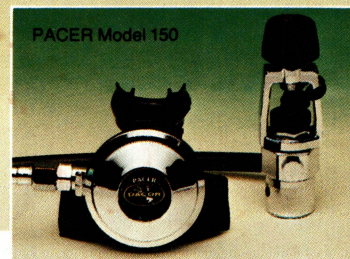
PACER Model 900



PACER Model 600



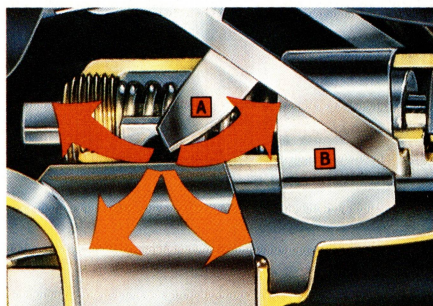
PACER Model 300



PACER Model 150

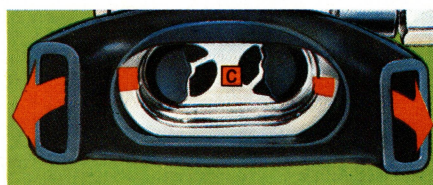
FIRST TOTALLY BALANCED SECOND STAGE FEATURING THE EXCLUSIVE VENTURAMATIC™ SYSTEM

Dacor is proud to present a complete new line of PACER® regulators. These *Positive Air Controlled Equalizing Regulators are not just an improvement but the most important innovation in regulator "breathability" in the 25 years we have been manufacturing diving equipment. Dacor has harnessed a principle of physics known as "Venturi" and invented a revolutionary *Venturamatic* System that completely "air balances" the PACER second stage. At the same time Dacor's *Venturamatic* System controls run-away "Venturi" flow, surging, and free-flow—which, until now, have been a problem with all high volume regulators. The PACER's smooth laminar flow allows the diver to get the air he needs when he needs it and, at the same time, provides the same smooth, natural respiration as surface breathing at any depth and under the most extreme demand conditions. Dacor's exclusive *Dual Exhaust* feature ideally matches the PACER's large volume inhalation with the 50% easier exhalation effort.



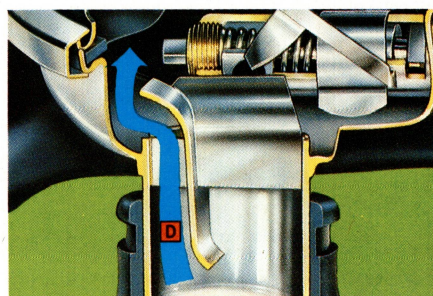
Exclusive Venturamatic™ System

(PATENTS PENDING) Here's how it works—As air flow increases with lowering of valve lever, the *Venturamatic Flow Vane* (A) which is an integral part of the lever itself, also lowers and disperses the air stream in amount and direction related to volume of flow to prevent surging and uncontrolled venturi. The *Venturamatic Booster Clip* (B) effectively directs air flow to create and control venturi, making valve opening easier under high volume demand.



Exclusive Dual Exhaust System

Here's how it works—Two large exhaust valves (C) eliminate exhalation resistance and make the PACER 50% easier in exhalation effort and purging.



Exclusive Anti-Free Flow Device

Here's how it works—When PACER is removed from the mouth underwater, water enters special chamber (D) thus balancing ambient water pressure on internal side of the diaphragm and stopping air flow. This function is automatic and takes a maximum of 3 seconds.



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BUY THE ORIGINAL**



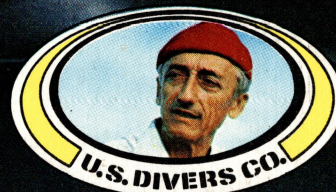
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Chairman of the Board

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